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COMMUNICATIONS

A CONTRIBUTION TO THE STUDY OF EXFOLIATION OF THE LENS CAPSULE OR GLAUCOMA CAPSULO-CUTICULARE WITH ANATOMICAL PREPARATIONS

BY

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THIS new subject, a fruit of the handling of the slit-lamp in bio-microscopy of the eye, was introduced into ophthalmology by Professor Vogt, of Zürich, (*Klin. Monatsbl. f. Augenheilk.*, 1925) one of the pioneers of that branch created by Gullstrand, of Upsala, by his invention of the slit-lamp in 1911 (Heidelberg Congress).

I beg to call attention to the fact that similar conditions of the pupillary border were noted in the pre-biomicroscopic era, but were differently interpreted, as they were always ascribed to a bleaching of the pars-iridis retinae in old people as a senile change, in chronic glaucoma as due to the increased intra-ocular pressure or, in diabetes, to depigmentation of the pigmented epithelium of the iris.

Vogt himself did not give it the right description in his first atlas; it was early in 1925, when he published his first 12 cases in the *Klin. Monatsbl. f. Augenheilk.*, that we ophthalmologists had the most complete and most precise clinical description of this condition. Vogt knew that apart from the bleaching just mentioned,

this manifestation is independent of the pigmented epithelium of the back of the iris, and that it consists of new masses which only stick to the surface of that layer. He observed them also but rarely on the surface of the lens capsule, on the iris, and on the back of the cornea, and that they change from time to time in number and position. Simultaneously with the blue fluffy masses on the iris there is a special condition of the anterior surface of the lens which was never described before. This consists of a peculiar appearance, for a detailed description of which, I refer the reader to the original articles of Vogt, and the coloured plates appended to them. In short, the capsule shows, in most of the cases, superficial changes, central, peripheral, or both combined. The central change appears corresponding to the pupil as a disc distinguishing itself from the rest of the capsule by its homogeneous haziness, or its very faint opacity. This disc is very difficult to see, except in very strong illumination (arc lamp or over voltage of the nitra lamp). The peripheral changes show themselves in the shape of a festooned ring or crown of a finely granular opacity quite separate from the disc already mentioned, or attached to it by radial zones in the shape of a wheel.

The distal boundary of the crown stops 1 or 2 mm. within the zone of attachment of the anterior fibres of the zonula. At this part the capsule or the distal edge of the crown curls on itself, thus forming an acute angle looking towards the anterior pole of the lens or disc before mentioned. This peripheral zone of exfoliation might be a complete ring, or in early cases, just a sector of the anterior surface of the lens. Vogt asserts that there are no blue masses on the pupillary border without the presence in the same eye of desquamation of the lens capsule, or in other words, the capsular affection precedes that of the iris, *i.e.*, the blue masses are the result of the capsular exfoliation.

Nine out of the 12 cases of Vogt were glaucomatous. Pillat and others reported afterwards many cases without any rise of tension, and it has since become an established fact that this kind of glaucoma is, aetiologically speaking, secondary, although I considered it primary in describing my first case (seen in August, 1926, and published in the *Bulletin of the Ophthalmological Society of Egypt* for 1927) to distinguish it from the secondary glaucoma due to irido-cyclitis.

Vogt was confronted with two problems for solution; first, the nature of these blue masses; second, the presence of glaucoma in many of these cases. It goes without saying that the right explanation of the second problem depends on the solution of the first one. Whatever it is, for the time being it is accepted that these masses might block the filtration angle. As to their nature, Vogt tried to explain it in the absence of pathological specimens, only on a clinical basis, and it seems to me he succeeded. That they

are manufactured in the posterior chamber and propagated from there to the anterior chamber is undoubted. The hypothesis that they are inflammatory exudates or deposits of some nature is refuted by the simple fact that the tissues of the anterior chamber (back of the cornea and anterior surface of the iris) do not share in the same process. The characteristic picture of the lens capsule leads Vogt to think that the lens capsule undergoes some kind of degeneration as a result of which the iris leaves on it the imprints of its posterior surface. The debris of the zonular lamella (as it is this lamella that suffers first) thus produced from the friction between iris and lens represents the blue masses in question. We shall see in the ensuing paper if this theory can explain all the clinical facts.

Handmann published cases soon after Vogt and expressed his wish that this condition should be investigated histo-pathologically. He also advanced a theory that the pigmented epithelium of the posterior surface of the iris, as a result of degeneration, adheres to the anterior lens capsule; at this new place it *proliferates and produces a glass membrane.* He goes still further in his theory, stating that the fluffy masses at the edge of the pupil have a relation to hyaline degeneration.

Wollenberg (1926) published a case of fluffy masses and exfoliation of the lens capsule in one eye where the pupil was active. In the fellow eye, where the pupil was fixed, this pathological change did not occur. This observation is quite in favour of Vogt's theory.

Busacca, of Florence (1927) reported on 30 cases out of 186 persons, backed in this report by the microscopical examination of three globes, one of which was observed *in vivo* showing the process in question with the slit-lamp. The two others were chosen out of a collection of 28 cases of absolute glaucoma kept in the laboratory. His histological material also contains two pieces of iris from two cases examined before operation. Since this is the first histological work on this subject that was undertaken, it is justifiable to include it in this paper in short. (In microscopical sections the pellicles form small isolated groups of arborizing fungoid forms which are made up of a granular substance. These hang together in some parts. Generally speaking, we are dealing with a membrane of varying thickness. The differentiation of the exfoliation or pellicle formation from inflammation, or in other words, from an organized exudate, can be made out from the histological examination. The organized exudate has a glistening white colour, while the pellicles on the contrary, look bluish-white. The exfoliation on the anterior lens capsule has nothing to do with the zonular lamella. The deposits are always placed on the outermost lamellae of the capsule, as undoubtedly shown from the histological preparations. The idea of Handmann that the fluffy masses are related to hyaline degeneration

of the pupillary border is refuted by the fact that these blue masses can be met with in quite a healthy pupillary margin. The felt-like appearance which, however, is not observed in all cases, depends on the presence of a glass membrane on the iris. Nevertheless there is no relationship between the origin of this membrane and that of the position of these pellicles).

Busacca concludes that this clinical picture occurs only in advanced age and that it is frequently accompanied by rise of tension. He also states that the deposits bring on glaucoma and not the opposite.

Personal Observation.—Early in 1926, soon after my return from Zürich, I came across an old woman showing capsular exfoliation and pupillary masses in one eye (left one, the right eye remaining intact up to now) which was affected by syphilitic irido-cyclitis simultaneously with the skin eruptions (see case No. 2). In January, 1929, I was lucky to meet with another case (No. 15), an old man showing the pupillary masses on both sides, more advanced in the right than in the left. The latter has shown advanced opacity of the lens. A total extraction, Barraquer's, was decided upon for the left eye and was carried out successfully with complete iridectomy under chloroform. At the same sitting the right eye was excised, being practically blind through rise of tension. Three specimens for laboratory investigation were obtained from this case (*a*) a piece of the iris of the L.E., (*b*) the lens of the same eye, (*c*) the right globe.

The first two specimens unfortunately did not show anything that could be taken as conclusive (probably through their mutilation during operation or during their preparation for sections). The disease was advanced in the right eye to an extent which I have never observed in any of my cases nor seen described by other writers.

The grey zone of the pupil was the broadest that I have ever come across and occupied 1-2 mm. in breadth. A coloured drawing was made for me by Dr. Haig, the ex-pathologist of the Memorial Ophthalmic Laboratory, Giza, showing the clinical appearance of the iris. In microscopical sections the changes occurring in the iris are shown while those of the lens are wanting, as this was small and subluxated and did not show the fine capsular changes.

The furrows and the grooves on the back of the iris are filled up with small highly refractile masses similar to the lens capsule. The edge of the pupil, insufficiently described by other investigators, presents a band of a dense or compressed structure showing fine lamellations, a condition which was not recognised before in ophthalmology.

In the January number of the *Klin. Monatsbl. f. Augenheilk.*, 1929, Rehsteiner, the chief of Vogt's clinic, published 17 cases carefully examined. At the same time he reported on a histological examination of one of the globes excised for recurrent pains. A good abstract of the literature of the subject accompanied the clinical material. A histological description of the iris and lens is quoted here.

Iris.—The pigmented epithelium is irregular and keeps itself to some extent (about 0·2 mm.) from the pupillary border. The stroma is hyperaemic and strongly cellular; granulation vascular tissue ***lies on the most anterior layer in big areas.*** The innermost pigment epithelium layer is covered with an exudate in the way of a glass membrane with few cells. The granulation tissue is seen in few parts only.

Lens.—The lens capsule is relatively thick. Fine striations of the capsule are noticeable in many sections. Exfoliation of the most superficial lamellae can be observed at a distance of 1·1 to 1·6 mm. away from the equator of the lens in numerous sections, which is much similar to its neighbouring zonular fibres with the difference that the free end of the exfoliation looks towards the anterior pole instead of looking towards the equator, as is the case with the zonular fibres. The anterior surface of the capsule at the axial part of the anterior surface of the lens could not be studied because it was covered with a thin layer of exudate, rich in cells and partly pigmented.

Unfortunately this case was not free from an inflammatory process and, so I think, cannot be taken as a criterion of this condition. Rehsteiner expressed the hope to examine further cases free from inflammatory reactions.

A year later, Vogt published in the same review a new case that fulfils the desiderata and in which the exfoliation is more pronounced than the former one as seen from the four plates produced in that work. In the same paper, Vogt concluded that the percentage of glaucoma capsulo-cuticulare to chronic glaucoma is 8·6 per cent.

In the Zürich clinic, the number of cases of exfoliation published up to date is 45, of which 34 show glaucoma symptoms, or about 75 per cent. He adds also that the operative prognosis in that form of glaucoma is not so good in comparison to the ordinary form of glaucoma, a view that we in Egypt also share.

According to Rehsteiner, this condition is only seen in 17 per thousand, in people above 60 years of age. (This last proportion is not a hospital one; it was made in the asylums for the old, in Zürich and the suburbs). As a rule this is the lowest limit of age for this exfoliation, although younger patients have been reported, Alling, 56; Busacca, 52; Rehsteiner, 55; Trantas, 45.

Vogt and Rehsteiner have never seen felt-like masses on the pupillary edge without the simultaneous presence of exfoliation of the capsule, although the reverse can take place. Rehsteiner, in his 17 cases reported 6 who presented capsular exfoliation without pupillary masses.

Trantas (Athens) gives different statistics amongst 1,540 new patients in his private clinic; 125 men and 112 women have shown the syndrome of Vogt, or more exactly speaking, 214 eyes investigated for men and 221 for women. In fact the real percentage is higher than this, says Trantas, because most of these cases were examined without pupillary dilatation. Furthermore, he adds that if all the fine capsular changes seen in old people are noted, and considered as degenerative lesions, it will not be an exaggeration to say that a quarter of all people above 55 years of age will show capsular or irido-capsular lesions.

Among his patients, Trantas observed chronic glaucoma only in 14, or 33 per cent.

This is much lower than the percentage given by Vogt and Rehsteiner, which is 75 per cent. On the contrary, advanced senile opacities of the lens were frequent and amounted to 71 per cent. He mentioned, moreover, three cases having shown senile central scotoma without glaucoma, and in three others sub-epithelial greyish patches. Fine vitreous opacities were frequently observed. He concluded that a syndrome of exfoliation is not caused by glaucoma. Its being a senile lesion is confirmed by the frequency of lenticular opacities. These eyes have a tendency to glaucoma, but this is far from being a constant thing.

As a rule, glaucoma develops after the formation of the capsular opacity. It is to be noted that (contrary to what usually happens) in two of Trantas' cases of unilateral glaucoma, the lesions in question existed only in the healthy eye, the glaucomatous one being free from the condition. Trantas says that the capsular lesions are the result of a senile degenerative process which attacks not only the anterior capsule, but nearly all the other ocular tissues, especially the glass membranes and the transparent media, the vitreous body included; a similar alteration in the excretory channels for the intra-ocular fluids explains the tendency to glaucoma. The pellicles getting free in the aqueous will be deposited in the angle of the anterior chamber and add to the obstruction of the degenerated pectinate ligament and Schlemm's canal, a degeneration which is not localized to the anterior capsule. The pigmented epithelium of the posterior surface of the iris shares in the formation of the deposited "molecules."

The picture that the capsule takes is as if it had been sprinkled over with a white powder (*saupoudrement*) and has an analogy not only to what we observe in the subepithelial layer of the cornea in

old people (*kératite micro-ponctuée sénile*) but also to the punctate senile vitreous opacities described by Koby in his book and in that of Meesmann. Owing to Vogt's syndrome, we have now a better comprehension of the form of glaucoma which occurs after cataract operations without apparent cause, says Trantas. Many cataractous patients are affected with this syndrome; it is not astonishing to see in some of the operation cases for cataract that the degenerative process advances towards glaucoma independently of the operation. I must say, adds Trantas, that once the cataract is mature, capsular opacities, crown and disc are difficult to make out; in such instances the change in the pupillary border helps in the diagnosis.

Let me say once more, according to my own observations, continues Trantas, that the size of the disc is not of the same extent as that of the pupil in old age, or in other words, the edge of the disc is not produced by the pupillary action on the lens. I do not think that at the beginning of the degenerative process there is a formation of a thin membrane spread on the whole surface of the capsule and that the ultimate picture or design is produced by the iris movements. One often sees early in this process, some isolated opacities in the central part of the capsule associated with an opacity of a small segment at the periphery which from the very beginning, sends in tongue-shaped prolongations. Trantas agrees with Vogt in that a second exfoliation can take place within the first one, a phenomenon indicating a recent exfoliation on the top of that area which has already shown an old exfoliation, or in other words, that all the capsular superficial lamellae take part in the degenerative process in turn, one after the other.

Other Clinical Phenomena

The brown pigment on the back of the cornea found in 13·6 per cent. of my cases, and reported also by Rehsteiner, especially after pupillary dilatation seems to be an interesting occurrence and is worth consideration. Whether it is a mere coincidence in these cases or a part in the syndrome of this disease is difficult to tell. Dissemination of the uveal pigment was reported by Koeppe as an early bio-microscopic sign in glaucoma. It is of a usual occurrence after intra-ocular operations and uveal inflammations. Besides operations and uveal inflammatory conditions, this pigment was not reported in other ocular manifestations. In many of the cases reported in my lists, the pigment was observed before the onset of glaucoma. It seems that the iris tissues, especially those cells of the pars-iridis retinae, share in the degenerative process, and the pigment is set free in the aqueous. This explains the observations of Rehsteiner, as the artificial dilatation helps in crushing or in teasing the diseased pigmented epithelial cells on the back of the

iris, resulting in a fall of the pigment granules from behind the iris like drops of rain. Atrophy and depigmentation of other structures of the iris are frequently seen by diaphanoscopy in these cases. The pigment granules thus set free from the different pigment cells of the iris wander to reach the aqueous and from this fluid to the back of the cornea as usual. Some of the eyes bearing this affection of capsular degeneration show a low degree of vision which cannot be accounted for by the clinical findings or in other words, there is no ratio between the amount of sight left and the degree of pathological change. A good example of this is the case of Nosseir Bey, (case No. 4), the left eye of whom is practically blind, counting fingers at 50 cm. without apparent cause. This eye, although showing sclerosis of the nucleus, has a fairly good peripheral red reflex and a fundus free from any gross changes. It is interesting to note that many of the eyes afflicted with this degenerative process show an increase of intra-ocular pressure, a relative one in comparison with the healthy fellow eye, before passing to the abnormal limit (examples, cases No. 4, 10 and 11). This by itself might explain the deterioration of vision in some cases.

Personally, I have seen in another category of cases the development of excavations of the disc accompanied by fields characteristic of glaucoma in eyes which have never shown, after long observation and careful tonometry, any rise beyond the normal limit, but, of course, with a definite difference between the two globes. This might be called relative glaucoma, and might explain the unaccountable deterioration of vision.

Histopathology of my own Material.—First specimen, case No. 15. As soon as the eyeball was excised it was put in 4 per cent. formalin and sodium chloride solution and cut vertically; stained with eosin and haematoxylin in the ordinary way.

Cornea and Angle of Anterior Chamber.—There is no particular change either in Descemet's membrane or in the endothelial layer lining it. Pellicles or felt-masses are very scarce on this layer. In the anterior chamber some coagulum is present, either pathological or an artefact, made of a finely granular substance which stains faintly with eosin and is not highly refractile. Some of this substance lies on the anterior surface of the iris (as can be seen in Fig. 1), where is found the part of its base sharing in the formation of the angle of the anterior chamber. This angle is of normal width similar to what occurs in many of the forms of secondary glaucoma, unlike what happens in primary absolute glaucoma. The angle, notwithstanding its width, looks crowded, and the spaces of Fontana look blocked by a black pigment. A homogeneous mass (big pellicle) runs from the pectinate ligament to an opposite point at the base of the iris. This pellicle if not an artefact would be probably one of those masses described by Trantas passing from the

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back of the cornea to the iris, and originating from the exfoliated capsular lamellae; against this possibility is the fact that it is not highly refractile. The absence of this property might be due to its lying flat in the section or being looked at by the microscope from its flat side. On the opposite side of the angle, a few fine minute refractile masses lie on the pectinate ligament.

Iris and Edge of Pupil.—In general configuration the pupillary border in this case looks rounded instead of tapering in a wedge-shape as is seen with the normal iris. The pars-iridis retinae stops

FIG. 1. CASE NO. 15.

a short distance from the free edge of the pupil and is not seen from the front. Its normal place on that edge is taken by small pigmented nuclei from within, and a finely lamellated mass from without. This mass starts where the pars-iridis stops, and represents the broad bluish-grey band or circular ring observed clinically *in vivo*. It differs in size in different parts and sections. It stains faintly with eosin and is not highly refractile. Although its origin is obscure, I do think at the present moment that it is formed by the superposition of the minute exfoliated masses (Fig. 2). During life, in cases where this ring is formed, the recent felt-masses are seen to be independent of it as they are seen to peep from behind it, or stick loosely to it. Evidently it is not hyaline as supposed by Handmann.

On the back of the iris there is a layer, newly formed, more or

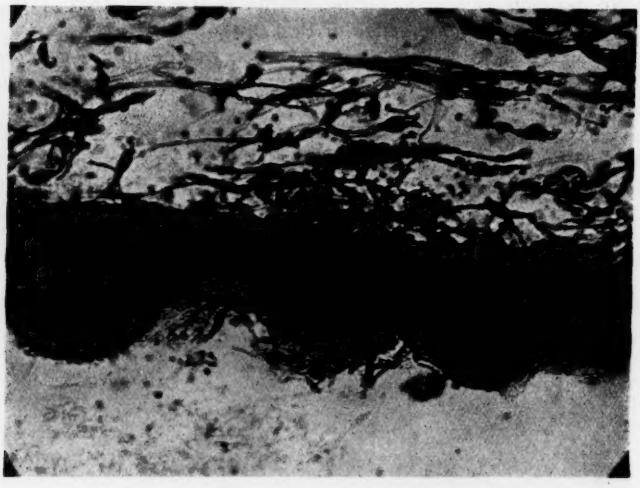

FIG. 4 CASE NO. 15.

Showing masses in the furrows.

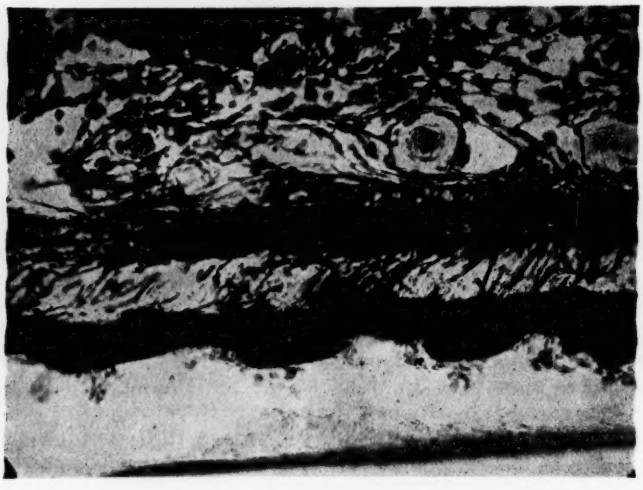

FIG. 5. CASE NO. 15.

Masses arborizing as described by Busacca.

less continuous, rarely interrupted, thick in the furrows and thin in the ridges. This layer is mostly composed of the minute felt-masses in question with a granular substance cementing these masses together (Figs. 4 and 5).

This granular substance, which looks like fibrin, might be powdered lens capsule seen clinically as granular patches before being shed.

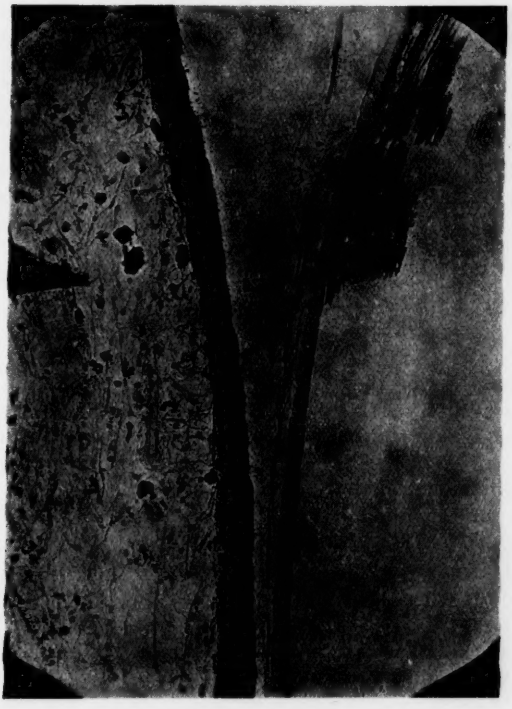

FIG 6.

Late Professor E. Fuchs. Zonular lamella *in situ*, in continuation with the zonula but refracts the light somewhat differently from the rest of the capsule.

This felt is not deposited only on the back of the iris but goes further, to the part of the ciliary processes and ciliary body forming the posterior chamber, as well as on the fibres of the zonula taking part in the formation of that chamber. The felt-masses have the same affinity for colours as the capsule and the same refractile

power. Their shape is rod-like, either straight or distorted (see Fig. 4). In Fig. 5 can be seen the masses, mainly granular, arborizing as described by Busacca. In some parts the masses look like mycelium.

Lens.—The lens is subluxated; the capsule ruptured during preparation and for that reason I will refrain from speaking about it except that it is much thinner than normal, contrary to what was described by Rehsteiner and Vogt; both have reported thickness of the capsule in their cases. This diminution in thickness in my specimen may be accounted for by the capsule having been used up to produce all that amount of felt seen in this particularly advanced case.

In conjunction with the illustrations already mentioned, I might make use of other sections forwarded to me by the late Prof. Fuchs on February 17, 1928, in answer to my letter on this subject for the purpose of elucidation on some points. The first (inflammatory glaucoma, Fig. 6) shows the zonular lamella in continuation with the zonula (ligamentum lentis) and distinguishable from the capsule as an extremely thin layer refracting the light somewhat differently from the capsule itself.

In my first paper on exfoliation (O.S. of Egypt, 1927 Bulletin), I have said that this process is an exfoliation of this lamella. After the recent publications of Vogt and Trantas, the exfoliation does not seem to be limited to that lamella only, all the superficial lamellae share in this manifestation one after the other. The second section deals with a case of absolute glaucoma, where a piece of the zonular lamella is detached and folded within the posterior chamber (Fig. 7). On the pupillary border of the opposite side, a homogeneous mass (coagulum), is seen (Fig. 3).

The master of pathology of the eye questions in his letter whether it corresponds with the fluffy masses of Vogt. To my mind this coagulum might be similar to the hyaline degeneration of Handmann but it has nothing to do with the syndrome described by Vogt, the two pictures (Figs. 2 and 3) are absolutely different from each other.

Histopathology of the Second Specimen. Right eyeball of case No. 24. The vision of this eye was lost through glaucoma. The left eye did not show any sign of rise of tension during her stay in hospital, notwithstanding medicinal pupillary dilatation. Right eye fixed in Bouin's solution, embedded wholly in celloidin and cut vertically.

The cornea shows nothing characteristic except impregnation of of the cubical endothelium lining the lower half of the posterior surface with pigment granules (see Fig. 8). It is interesting to note that this pigment could not be seen clinically, which means that the percentage of 13·6 is in fact a low one, and if all the

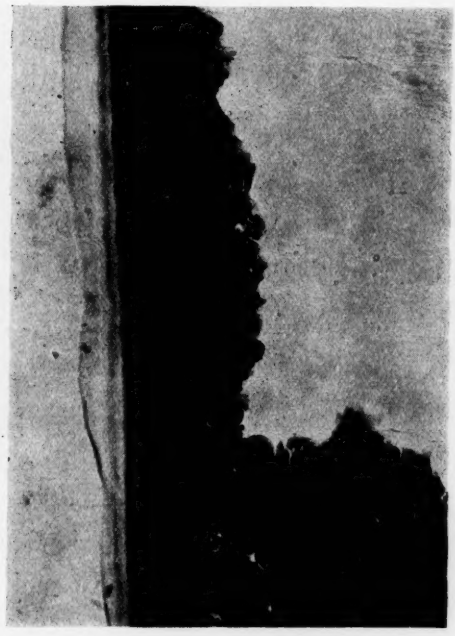

FIG. 7.

Showing detachment of zonular lamella in the posterior chamber. Professor E. Fuchs's material.

FIG. 2. CASE NO. 15.

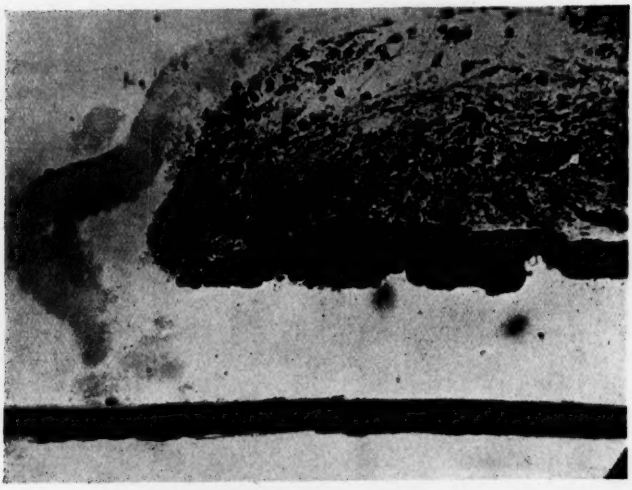

FIG. 3.

Late Professor E. Fuchs. See homogeneous mass (? coagulum) on the pupillary border.

FIG. 8. CASE NO. 24.

Cubical endothelium of corneal posterior surface impregnated with pigment granules.

eyes had the same fate this number could have been much higher denoting that the depigmentation process goes hand in hand with the exfoliation.

The angle of the anterior chamber is wide as described in the first specimen. The meshes in the pectinate ligament are heavily studded with pigment granules as suggested by Trantas.

Iris.—This membrane is the site of most of the pathological changes and is worth a minute study. The anterior surface looks

FIG 9. CASE NO. 24.

Posterior surface of iris showing pellicles from lens capsule stuck to it and following its furrows and ridges.

normal; here and there are masses of fine granules, either fibrin or powder from the lens capsule. The free border is not rounded as in case No. 15; it is rather tapering as is met with in normal cases.

The pigment layer of the posterior surface stops a short distance away from the pupillary border leaving that border unpigmented. The tissues of the very tip of the iris are rarefied and devoid of pigment cells. The proximal end of the sphincter is poorly covered with connective tissue and lies nearly bare in the aqueous humour. The posterior surface of the iris is covered with a membrane similar in appearance to that of the first case. There are in it short rods, highly refractile, or complete flakes from the lens capsule (Fig. 9). Besides there are, here and there, masses of

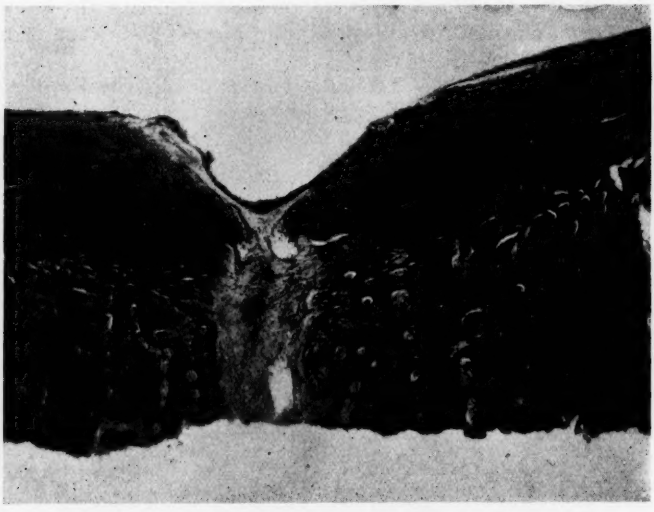

FIG. 10. CASE NO. 24.

Absolute glaucoma. Optic nerve in section, showing shallow excavation.

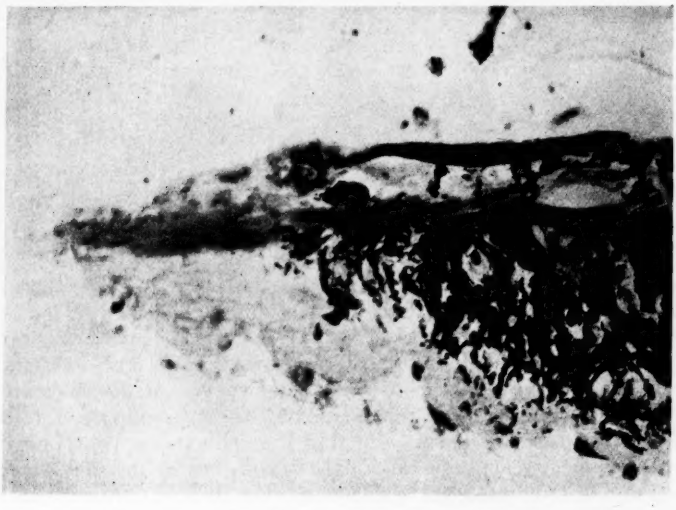

FIG. 11. CASE NO. 24.

Note the rarefaction and depigmentation of pupillary border, the sphincter standing out by contrast.

mycelium-like arrangement of the same nature as the rods. This is a further proof of the capsular nature of these masses.

It is interesting to note that in sections the optic papilla did not show any cupping, except some yielding of the lamina cribrosa looking in that respect more like a physiological excavation than a glaucomatous one (Fig. 10), or in other words, there seem to be other unknown factors which help in producing blindness, besides the rise of tension.

SUMMARY

			Per cent.
Eyes showing pupillary masses ...	41	out of	44 = 90
Eyes with rise of tension	29	„	44 = 45
Persons showing glaucoma	13	„	24 = 54
Cataractous eyes	17	„	44 = 39
Pigment on posterior surface of cornea	6 eyes	„	44 = 13·6
Youngest age	55 years		

N.B.—Total, 24 patients=48 globes, 44 of them used in the statistics, four being destroyed by other diseases. Five patients only reported from Giza Ophthalmic Hospital and its Memorial Laboratory, although the number of cases noted by me and by my colleagues is much higher, as only five tickets could be traced.

This ailment is insidious, of a long duration, and takes years for its development. It is rare, but the more it is looked for, the more it is met with. According to the Zürich Eye Clinic, 17 per thousand of old people above 60 years of age (not hospital patients) show Vogt's syndrome. Half of this number at least, if not all, tend to develop sooner or later chronic glaucoma, and it figures as 8·6 per cent. of chronic glaucoma. This disease is not an inflammatory one, it is a senile degeneration of the lens capsule of some sort. Depigmentation of the iris tissues plays an important part in this process. As a rule the tension rises gradually, and it is higher in those eyes which show degenerative process most. The intra-ocular pressure, before passing to the abnormal, may stay for a long period within the normal limits, but decidedly higher than those eyes which do not show the affection at all, or only to a slight extent. This condition by itself is apt to have a deleterious effect on the field of vision and the optic nerve.

The edge of the pupil undergoes certain definite changes; soon

after the exfoliation of the lens capsule in early cases, isolated felt-masses, bluish-white in colour, begin to appear, principally at the pupillary border, on, or within, the corrugated ring of the retinal pigmented cells of the iris (pigment cells of the back surface). Later on, this corrugated black or darkly pigmented ring at the edge of the pupil disappears slowly, either partially or totally. A grey band or ring replaces the normal black one. This abnormal appearance of the pupillary border can be produced either by the superposition of the felt-masses at the pupillary border or by ectropion of that border showing the newly formed membrane aforementioned, and produced by the felt-masses on the back of the iris.

These facts are observed in the first eyeball (of Case No. 15, Abdullah) submitted for histological examination. From the second globe (Case No. 24) submitted to the same process, we learned that a similar grey ring can be produced by the depigmentation of the very tip of the iris tissues bringing to view the proximal edge of sphincter muscle.

The writer wishes to express his very cordial thanks to Dr. A. F. Tobgy for his valuable aid in microphotography and to other colleagues for their help in collecting these cases.

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No. of Case	Age	Corneal Post. Surface		Pupil		Lens Capsule		Tension	Fundus Remarks	Vision
		Masses	Pigment	Masses	Atrophy	Disc	Crown			
(1) First case before Vogt's publication	70	R. –	–	+	+	Aphakia	No capsule left in P.A.	Occasionally +	O.D. pale	3/60 with correction
		L. +	+	+	+	?	+	,,	Not seen, cataract	H.M.
(2) 15/8/26 *1927 Bulletin O.S. of Egypt*	70	R. Normal						T.N.		6/24
		L. +	–	+	–	–	++	65 M.L.		6/60
(3) 17/12/27	75	R. No mention		No mention	–	–	No mention	T.N.		3/60
		L. ,,	,,	+	–	–	+	T.N.		3/60
(4) 31/1/28	70	R. –	–	+	+	Pigment	Hardly any early exfoliation	28 M.L.		6/60
		L. –	++	++	+	–		35 M.L.	L.O.D. not pale, no cupping, nuclear sclerosis	c.f. 50 cm.
(5) 8/4/28	70	R. –	–	+	–	–	Exfoliation	T.N.		6/60
		L. –	–		Unsuccessful lens extraction					No P.L.
(6) 9/6/28	70	R. –	–	+	–	–	Exfoliation	35 occasional rise 40-45 M.L.		6/60
		L. Old adherent leucoma with rise of tension								H.M.
(7) 7/7/28	77	R. –	+	+	–	No mention	Advanced exfoliation	T. + 3		No P.L.
		L. –	+	+	+	,,	Not advanced	T. + 3		c.f. 1 m.

PRIVATE—*continued*

No. of Case	Age	Corneal Post. Surface		Pupil		Lens Capsule		Tension	Fundus Remarks	Vision
		Masses	Pigment	Masses	Atrophy	Disc	Crown			
(8) 29/9/28	75	R. –	–	+	No mention Amblyopic	No mention	+	T.N.	Extract. by me	With cor. 2/60
		L. C. nebula					Ant. polar	cataract free	from exfoliation	c.f. 1 m.
(9) 5/11/28	60	R. –	–	+	–	–	Filaments and pigment on anterior capsule	T.N.		No mention
		L.					Sec. glauco	ma after irid	ocyclitis	No P.L.
(10) 23/5/30	70	R. –	–	+	+	?	+	T.N. 20	Total extract. after trephining by me successful	6/36 with cor.
		L. –	–	+	+	?	+	38 M.L.	Cataract	H.M.
(11) 4/12/30	76	R. +	–	+	Partial rigidity for dilatation +	Masses on surface	+	35 M.L. 24-28 with glaucosan	Extra capsular iris submitted to sections	H.M. with correction ?
		L. –	–	+	same +	–		24 M.L.	Good R.R., no gross changes	1/60
(12) 4/12/30	65	R. –	–	–	–	–	–	T.N.	——	——
		L. –	–	+	–	Not mentioned	+	T.N.	——	——
(13) 24/12/30	67	R. –	–	+	Not mentioned	Subluxated lens	Not seen	+ +	Absolute glaucoma	No P.L.
		L. –	–	+	,,	+	+	Normal with miotics +	Slight myopia	3/60 with cor. 6/36
(14) 17/1/31	65	R. –	–	+	–	–	Fine change	15-20 M.L.		1/60
		L. –	–	+	–	+	–	,,	,, ,,	1/60

GIZA OPHTHALMIC HOSPITAL AND MEMORIAL LABORATORY

No of Case	Age	Corneal Post. Surface		Pupil		Lens Capsule		Tension	Fundus Remarks	Vision
		Masses	Pigment	Masses	Atrophy	Disc	Crown			
(15) 17/1/28 R. globe excised for sections.	76	R. Not mentioned		+	+	Lens subluxated	Subluxated	45 M.L.	R. and L. cataract	H.M.
		L. ,,	,,	+	Not mentioned	Not mentioned	Exfoliation	,,	L.O.D. pale, no cupping	– 3/60 with cor.
(16) 18/3/28	65	R. Absolute glaucoma with detatch. of retina								No P.L.
		L. No mention	+	+	No mention	Not mentioned	No mention	27 Sch.		1/60
(17) 17/5/28	70	R. +	–	+	+	Not mentioned	No mention of exfoliation	22 Sch.	Cataract	H.M.
		L. –	+	+	+	,,	Wide exfoliation	,,	Cataract, immature	20 cm.
(18) 4/6/28	60	R. –	–	+	No mention	Nothing seen from lens except central part due to rigidity of pupils, all means tried for dilatation but failed	Exfoliation	18 Sch.	Brown nucleus	H.M.
		L. –	–	+ +	,,	No mention	No mention	18 Sch.	,, ,,	H.M. bad proj.
(19)	70	R. –	–	+	No mention	No mention of exfoliation	No mention of exfoliation	T.N.	Senile cataract	Not taken
		L. –	–	+	,,	Pupils rigid like previous case		T.N.	,, ,,	,, ,,

KASR EL AINY HOSPITAL

No. of Case	Age	Corneal Post. Surface		Pupil		Lens Capsule		Tension	Fundus Remarks	Vision
		Masses	Pigment	Masses	Atrophy	Disc	Crown			
(20) 23/3/30	50	R Not mentioned		+	+	Not mentioned	Not mentioned	24 Sch.		H.M.
		L. ,,	,,	+	+	,,	,,	50 Sch.		No P.L.
(21) 24/5/30	65	R –	–	–	–	–	,,	18 Sch.		3/60
		L. Not mentioned		+	No mention		Capsule even	18 Sch.	Phacoerisis	6/36
(22) 20/12/3(	55	R. –	–	+	–	Not mentioned	Exfoliation	18 Sch.	Coloboma up with good result	cf. 50 cm.
		L. –	–	+	–	,,	Exfoliation more	35 Sch.	Retrephined by me for recurrence of tension, nuclear opacity	4/60
(23) 1/1/31	65	R. –	–	+	–		Aphakia	15 Sch.		1/60 with cor. 4/60
		L. –	–	+	–	–	Exfoliation	31 Sch. 21 under drugs	Total extract., good result, lens prepared	?
(24) R. excised for sections	60	R. –	–	+	+	Subluxated		50 Sch. after glaucosan = 28 Sch.		No P.L.
		L. –	–	+	+	–	+	22-26 Sch.		4/60

THE EFFECT OF ADRENALINE ON THE INTRA-OCULAR PRESSURE AND ITS CLINICAL SIGNIFICANCE

BY

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MUCH work has been done upon the action of adrenaline on the pressure of the eye when the drug has been administered as drops in the conjunctival sac, as a sub-conjunctival or retro-bulbar injection, or by the intra-venous route. The importance of the matter from the clinical point of view is considerable, inasmuch as adrenaline has been widely advocated and employed as a measure for lowering the intra-ocular pressure in cases of glaucoma, more particularly of recent years by Hamburger in the synthetic preparation "glaucosan." In the experimental observation of its effects the intra-venous route of administration is the most satisfactory method to employ owing to the rapidity and the constancy of the subsequent reaction, and the present paper deals solely with this aspect of the matter. Our apology for re-introducing the subject is that we believe we have been able to amplify and co-ordinate the results of former investigators by the employment of more accurate and delicate technique.

The conclusions of those who have investigated the action of adrenaline on the intra-ocular pressure when the drug has been administered by the intra-venous route have been, to a certain extent, indeterminate. In some experiments a rise in the intra-ocular pressure has been obtained, in others a fall, in some a fall and then a rise, and in others no observable change at all. Thus Parsons (1903) obtained a rise in pressure, the intra-ocular pressure running parallel to the blood pressure; Henderson and Starling (1904) sometimes obtained a rise and sometimes a fall, concluding that it was not permissible to use such experimental evidence as a foundation for any theory as to the action of this drug. Wessely (1908) got somewhat similar results. The explanation offered by all of these was substantially the same; when an increase in the pressure was recorded it was considered due to the rise in general blood pressure making itself evident in the eye; if a fall was recorded it was due to the local vaso-constriction asserting itself as the predominant feature in the picture and preventing the effect of the raised blood pressure making itself evident in the eye; and to these was added the further factor of a constriction of the plain muscle of the orbit which was particularly stressed by Wessely. These conclusions are all correct so far as they go, but they are susceptible to finer analysis.

Experimental Methods

In the experiments detailed in the present paper, two types of procedure were carried out. In the first place intact dogs were employed under ether-chloralose anaesthesia, the intra-ocular pressure being recorded by the manometer described in a previous paper (Vol. XV, p. 575, 1931), and the blood pressure being registered simultaneously by a mercury manometer connected with the carotid artery on the side opposite to the eye employed. In a second series of experiments records were taken on the eyes of perfused animals. In all the experimental work which has been done hitherto upon the variations of the intra-ocular pressure with drugs, intact animals have been employed, and it has frequently been difficult to dissociate the effects of general and local conditions. The administration of adrenaline involves a change in the general blood pressure and also

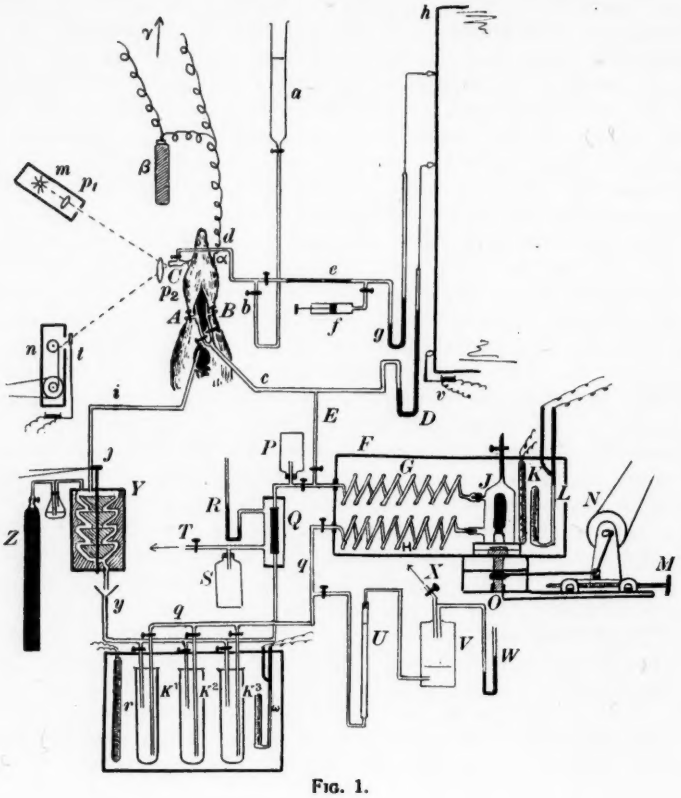

FIG. 1.

a local alteration in the vessels of the eye itself, and it is essential to eliminate one of these variables if the influence of the other is to accurately assessed. It was, therefore, considered advisable to isolate the eye completely from the influence of the vital centres, and maintain a constant circulation by means of an artificial heart and an artficial lung as in the apparatus seen in Fig. 1.

This apparatus is modelled essentially on that already described by us (Duke-Elder, 1929), but was improved considerably from experience: a minute description will therefore be unnecessary here. The same type of heart pump was employed (G, H, J, K, L, M, N, O) which pumped blood from one of the reservoirs (K_1, K_2, K_3), while the temperature was kept constant by electrically controlled thermostats. Between the pump and the dog a mechanism was inserted to maintain the blood pressure at a constant level despite any changes in the peripheral circulation of the dog's head. It consisted essentially of a side tube delivering into a length of soft rubber tubing (Q). This was enclosed in a cylindrical glass jacket in which air was maintained at the pressure level it was determined to maintain (100 mm. Hg) by pumping air through the side tube (T) and the pressure bottle (S), the rise of the pressure being registered on the mercury manometer (R). The heart pump was so adjusted that the pressure in the circulation was slightly above the required level so that blood, after passing through the inverted bottle (P) wherein the pulse beat of the pump was damped down to simulate the normal peripheral resistance of the circulation, arrived at (Q). Since the air in the jacket compressed the rubber tube (Q) up to the limit of 100 mm. Hg any excess of blood above this pressure forced its way through the tube and was short-circuited back to the reservoirs, so that the volume of blood reaching the head was maintained at a rigorously constant pressure level. On leaving the head through the tube (i) on its way to the reservoir, the blood was areated by passing through an artificial lung (Y) of the type devised and described by Bayliss, Fee, and Ogden (1928). Here it fell in cascades over a series of discs rotating in opposite directions, and in the meantime was exposed to a stream of a physiological mixture of oxygen and carbon dioxide fed from the cylinder (Z). A second improvement was represented by a constant infusion apparatus (U, V, W) of the type described by Burn and Dale (1926), by which a minute and constant supply of adrenaline was added to the circulating blood. This is necessary when studying vascular reactions in order to maintain the tone of the capillaries and replace the influence of the hormones of the normal animal. The amount of adrenaline constantly added was 1 c.c. of a 1 in 50,000 solution in physiological saline every five minutes. In place of decapitating the animal, as was done in former experiments, it was found that the condition of the head was improved by retaining it intact. The artificial circulation was introduced through the carotids without allowing any hiatus in the blood flow by the method described in the previous paper (Duke-Elder, 1929), and after the whole of the collateral circulation had been excluded by ligation of the appropriate vessels in the thorax, the venous blood was collected through the superior vena cava. As before the vitality of the head was maintained unimpaired for periods of several hours; the corneal reflex was present, the pulse beat was retained on the curve of the intra-ocular pressure, and the intra-ocular circulation was normal on ophthalmoscopic examination.

One of the factors which constantly tends to obscure vascular changes in the eye when these are deduced from variations in the intra-ocular pressure is the action of the extra-ocular musculature. This consists of two components: the plain muscle of Müller which protrudes the eye causing an exophthalmos, and the striped muscle (recti and obliques) which, when acting as a whole, tend to pull the eye inwards causing an enophthalmos. A contraction of either of these sets of muscles raises the pressure of the eye, and a relaxation of their tone induces a fall. Since the head of the experimental

animal was securely clamped in the same system as the optical manometer, any movement of the eye relative to the head was registered on the tracing of the intra-ocular pressure by a movement of the base line, a movement in one direction denoting an exophthalmos, in the other an enophthalmos. Movements of the voluntary muscles were eliminated by curare.

Two other collateral means of investigation were employed to aid in the interpretation of the results. In order to correlate variations in the intra-ocular pressure more exactly with events in the intra-ocular circulation, the rate of blood-flow in the eye (that is, essentially the state of dilatation of the arterioles) was measured by recording variations in the temperature. An insulated constantan wire was soldered into a hypodermic needle, the end of which was re-sharpened; this was thrust through the cornea into the anterior chamber of the eye which was not employed for manometric registration (α). This thermo-junction was balanced against a similar junction in a thermos flask (β) and connected with a micro-galvanometer (γ), the deflections of which were registered optically. When lying in the anterior chamber the needle excites no disturbance soon after its insertion, and changes in the flow of blood can be directly correlated with changes in the temperature. A typical reaction, for example, is a rapid fall of 2° to 4° C. which follows the occlusion of the carotid artery on the same side as the eye experimented upon, or a rise of the same order which follows occlusion of the abdominal aorta which diverts an excess of blood towards the head.

Confirmation of the events occurring in the local vascular system was obtained by the direct observation of the vessels of the iris of albino rabbits. It is not possible to observe these changes accurately in any but an unpigmented eye, and consequently dogs (which were used in the artificial perfusion) and cats (which were sometimes used in the experiments on intact animals) were unsuitable for this purpose. These observations had therefore to be undertaken on albino rabbits which were used anaesthetized by intra-peritoneal urethane. The head of the animal was immobilized in a convenient position, and when the drug in question was injected into the circulation, the vessels of the iris were observed through a Zeiss binocular microscope in the focal beam of a Gullstrand slit-lamp. At the same time an estimate of the degree of permeability of the vessels was based on the appearance of trypan blue in the aqueous humour after its intra-venous injection. In the normal animal the capillaries of the eye are impermeable to this dye; it is only detected in the anterior chamber when the permeability of the minute vessels has been increased by a very definite degree, when the presence of a minute amount in the anterior chamber is readily seen in the optical conditions employed.

The appearance and distribution of the minute vessels in the eye of the albino rabbit have recently been studied in considerable detail by Larsen (1930), and we were able to confirm his findings. The major circle of the iris is clearly seen as a large artery running a sinuous course round the periphery of the iris near the angle of the anterior chamber; it is fed directly by the long posterior ciliary arteries. It sends off a series of arterial twigs which run towards the pupillary margin, where a number of small arterial branches of arteriolar dimensions are seen under high magnification lying superficially in the stroma of the iris in the neighbourhood of the sphincter muscle. Apart from this, in normal conditions the surface of the iris is practically avascular; but when the capillaries are dilated the entire surface becomes dotted in varying degree with minute capillary loops. It is thus possible to observe directly three types of vessels and study their reaction under varying conditions: an artery (the greater circle), arterioles near the pupillary margin, and capillary loops upon the surface of the iris.

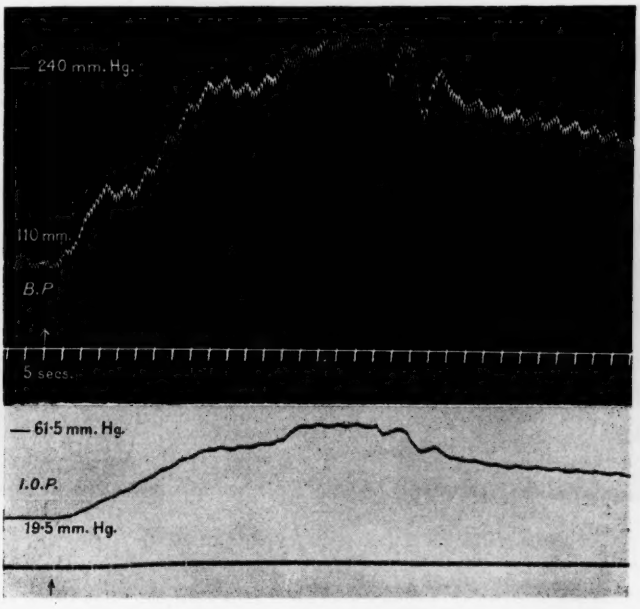

FIG. 2.

The effect of the intra-venous injection of 0 1 c.c. of 1 in 10,000 solution adrenaline in the intact dog. Upper curve, the blood-pressure; lower curve, the intra-ocular pressure.

Experimental Results

In experiments on the intact animal three types of results are obtained: (1) With small doses (0·1 c.c. of 1 in 10,000 solution and anything under this which produces an effect) the blood pressure is raised and the intra-ocular pressure tends to be raised passively with it, the amplitude and characteristics of the pulse being conveyed to the curve of the pressure of the eye (Fig. 2). This is essentially a passive effect, and would seem to show that any pressor action in the eye is less readily evident than upon the heart and those parts of the body, such as the skin, in which arteriolar constriction contributes to the general rise of blood pressure after the administration of adrenaline. (2) With large doses (of the order of 1 in 1,000 solution) the rise in general blood pressure is accompanied by a definite fall in the intra-ocular pressure during which the amplitude of the pulse is very considerably throttled down, suggesting that a considerable amount of vaso-constriction is occurring in the eye. Frequently these two effects are to some extent combined, and while the blood pressure rises the intra-ocular

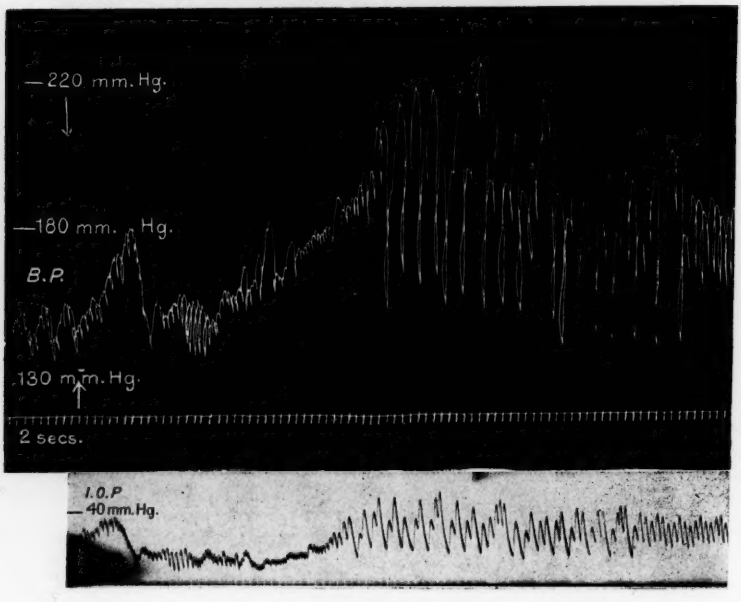

FIG. 3.

The effect of the intra-venous injection of 0·1 c.c. of 1 in 1,000 solution of adrenaline in the intact dog.

pressure falls initially, but when the general pressor reaction has reached its height, the barrier of arteriolar constriction in the eye is broken down and the intra-ocular pressure consequently rises, the ocular pulse showing a large excursion: again, the barrier offered by arteriolar constriction in the eye is relatively feeble (Fig. 3). These vascular events were confirmed by observations on the temperature in the anterior chamber, a rise of pressure being accompanied by a raising of the temperature by 2° to 3° C., and a fall of pressure being indicated by a decrease in temperature suggesting arteriolar constriction.

(3) A type of reaction where a persistent rise of the intra-ocular pressure occurs quite independently of any variation in the general blood pressure and associated with no characteristic alteration of the pulse beat is occasionally observed. This type of reaction is well illustrated in a paper by Wessely (1908), and is presumably due to the contraction of the plain muscle of Müller. Such a reaction is accompanied by no constant temperature variation.

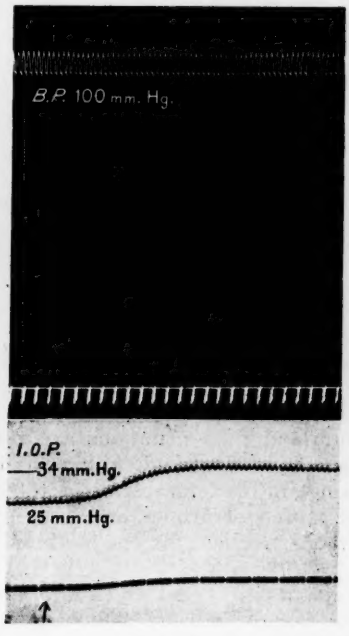

FIG. 4.

The effect of 0·2 c.c. of 1 in 10,000 solution of adrenaline in the blood of the perfused dog. The movement upwards of the base line in the tracing of the intra-ocular pressure denotes an exophthalmos.

These various effects can be analysed with much more accuracy by a study of the artificially perfused eye. With this preparation the almost invariable result of a small dose of adrenaline under 0·1 c.c. of a 1 in 10,000 solution is to give a rise in intra-ocular pressure. The rise in pressure may be of two types which may be due to different causes.

(1) An abrupt rise in pressure occurs which is associated with the movement of the base line in the direction of exophthalmos which is retained after curare (Fig. 4). The rise of pressure rapidly

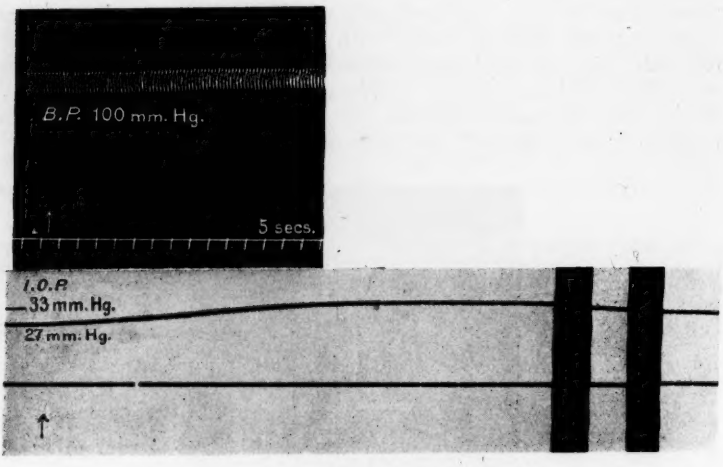

FIG. 5.

The effect of 0·1 c.c. of 1 in 10,000 solution of adrenaline in the blood of the perfused dog. The breaks in the tracing of the intra-ocular pressure denote 1 minute intervals. The blood pressure was maintained constant throughout.

attains a maximum and then maintains a constant level, or falls slowly being subject to no rapid alterations, and it is not accompanied by any change in the temperature of the eye. It is due to contraction of the muscle of Müller, and it is interesting that this effect is much more frequent in the perfused dog than in the intact dog.

(2) A second type of rise occurs which is of a completely different nature wherein the rise of pressure slowly and gradually attains a maximum and then falls (Fig. 5). It is accompanied by no change in the base line and no movement of the eye, and by a slight rise in the temperature of the aqueous humour (0·25° to 0·5° C.). The type of curve has all the characteristics which we have become

accustomed to associate with a vascular change, and since the rise of temperature is comparatively small, it appears unlikely that it is dependent on any great alteration in the arterioles. On the other hand, examination of the intact eye of the rabbit after the administration of adrenaline in such doses shows that the minute vessels on

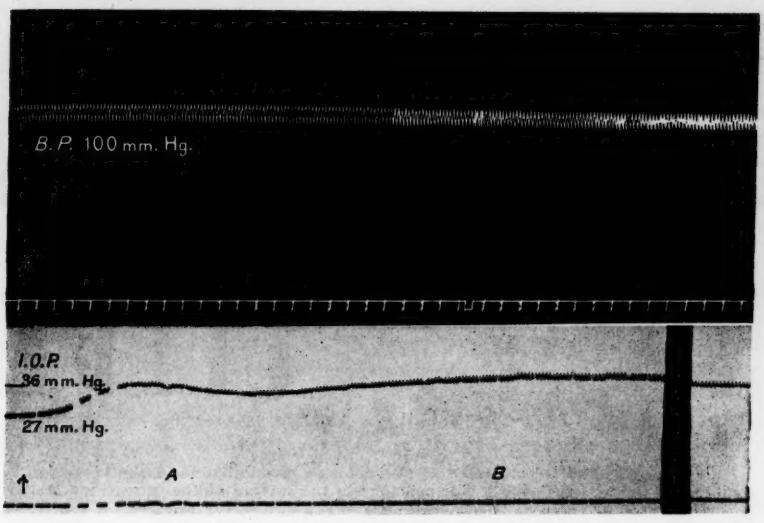

FIG. 6.

The effect of 0·15 c.c. of 1 in 10,000 solution of adrenaline in the blood of the perfused dog. The first rise in the intra-ocular pressure (A) is due to a contraction of Müller's muscle; the second (B) to capillary dilatation.

the anterior surface of the iris were dilated, and that their permeability is increased as is shown by the passage of trypan blue into the anterior chamber (see also Larsen, 1930). We consider therefore that this type of response is due to capillary dilatation; so far as we are aware it has hitherto escaped observation.

It occasionally happens that these two types of response are combined, the first rapid rise being due to the action on the external musculature, and the second, slower rise, being due to the dilatation of the capillaries (Fig. 6).

With larger doses of adrenaline (of the order of 0·1 c.c. of 1 in 1,000) a movement of exophthalmos with an associated rise in the intra-ocular pressure almost invariably occurs which, however, is more than counterbalanced by a fall in pressure (Fig. 7). The appearance in the iris of the rabbit of vaso-constriction is confirmed

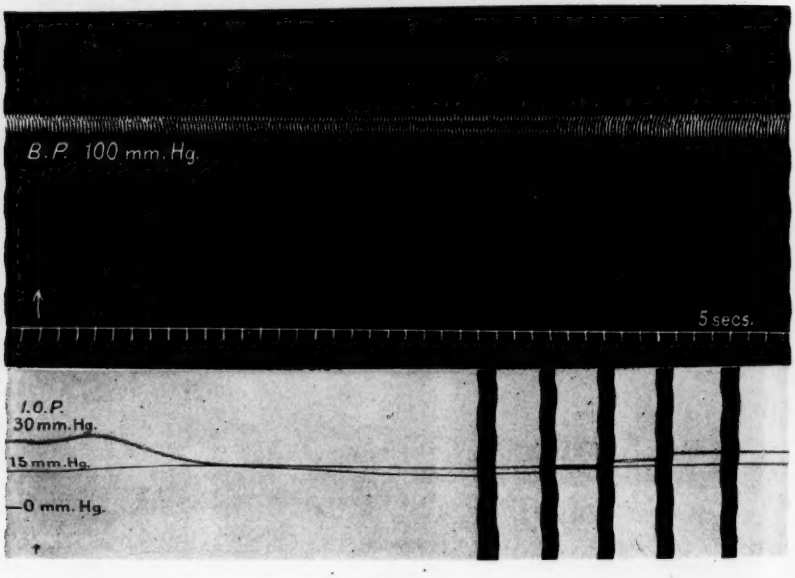

FIG. 7.

The effect of 0.1 c.c. of 1 in 1,000 solution of adrenaline in the blood of the perfused dog. The spacings in the tracing of the intra-ocular pressure represent 2 min. intervals. The movement upwards of the base line denotes an exophthalmos. Note the initial rise in the intra-ocular pressure followed by a fall.

by temperature records which show a definite fall (2° to 3° C.). This is obviously due to arteriolar constriction, and apparently this has become so pronounced that it can bring about a fall in pressure which is sufficient to counterbalance the rise due to muscular contraction.

Conclusions

It appears, therefore, as judged from pressure records in the intact animal and the artificially perfused eye, from the change of blood-flow as recorded by temperature changes, and from the direct observation of the intra-ocular vessels, that the action of adrenaline upon the eye itself uncomplicated by the effects of the general circulation is four-fold; first, in small doses it dilates the capillaries and raises the intra-ocular pressure; second, in large doses it constricts the arterioles and capillaries and lowers the pressure; third, in any dose it constricts the plain muscle of the orbit and

raises the pressure; and fourth, it dilates the pupil, an action which appears to be without any significant influence on the intra-ocular pressure, since it may be associated with either a rise or a fall. In the intact animal, where the situation is complicated by general vascular changes, the raised blood pressure tends to break through any arteriolar resistance which may be present and causes a rise in the intra-ocular pressure unless (with individual variations) the dosage is very high, when by local constriction of the arterioles may be sufficient to counterbalance this.

In man the action of Müller's muscle in raising the intra-ocular pressure will be very much less than in the dog, owing to its very small development in the former; it is probable indeed that it may be neglected altogether. Apart from this, the present investigation accounts for the variability of the action of adrenaline upon the pressure of the eye. Depending upon the dose in which it becomes effective in the eye it will either dilate the minute vessels raising the pressure, or constrict them tending to lower the pressure, and the possibility of the constriction becoming effective will depend upon the extent to which the drug is absorbed into the general circulation. The fact that the vessels of the eye react less markedly than those of large areas elsewhere in the body (particularly in the skin, and upon the heart itself) makes ocular changes subservient to general changes. A further complication arises which can only be referred to briefly at present. After the minute vessels have been exposed to the action of histamine-like substances they undergo a refractory phase wherein adrenaline is without constrictive effect. How far this may account not only for the frequent failure of adrenaline to produce a hypotensive effect in cases of acute glaucoma, but also for the fact that it may raise the pressure still further, will be made the subject of a future communication.

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A CASE OF PRIMARY MELANO-CARCINOMA OF THE CILIARY BODY

BY

R. H. BALFOUR BARROW and H. B. STALLARD

LONDON

PRIMARY melano-carcinoma of the ciliary body is a very rare disease, and hitherto only a few cases have been reported in the literature.

On January 16, 1931, H.S., a blacksmith, aged 61 years, presented himself for examination on account of defective right vision. For a month he had noticed that the right vision was hazy, and had become steadily worse. Two years ago his visual acuity was recorded as follows:—Right vision with + 0·5 sph. and + 0·5 cyl. → 180° = 6/6, left vision with +1·0 sph. and +1.0 cyl. → 180° = 6/9. The fundi were normal at this time.

Fig. 1 is a diagram representing the clinical appearance of a swelling situated on the iris and in the filtration angle at six o'clock. The summit of the swelling impinged upon the posterior aspect of the cornea, and the greater part of it was of a greyish brown colour, except in the filtration angle where it had a "pearly" appearance with two small vessels running over its anterior surface. Some of the anterior ciliary vessels at six o'clock were dilated and engorged with blood. The swelling did not extend to the free margin of the iris. The reaction of the pupil to direct light was sluggish, but the consensual reaction brisk. The pupil dilated well with homatropine, and it was impossible to detect by clinical methods any neoplasm in the ciliary body. The lens was opaque in the vicinity of the neoplasm, and the opacity had spread upwards to the pupillary area. The intra-ocular pressure was normal and there was no evidence of an inflammatory lesion in the eye.

A general examination failed to reveal a neoplasm elsewhere in the body. The patient was in good health and had no symptoms or loss of weight. The Wassermann reaction was negative. He was admitted to the Moorfields Eye Hospital, and a clinical diagnosis of sarcoma of the ciliary body and iris was agreed upon. Excision was advised and performed.

Pathological Report

(*a*) *Macroscopic.*—Situated in the iris and ciliary body at six o'clock is a neoplasm 3·5 × 3 mm. It is raised above the level of the anterior surface of the iris; the surface is nodular and impinges on the posterior aspect of the cornea. The colour is greyish white, except at the periphery where there is some dark brown pigment.

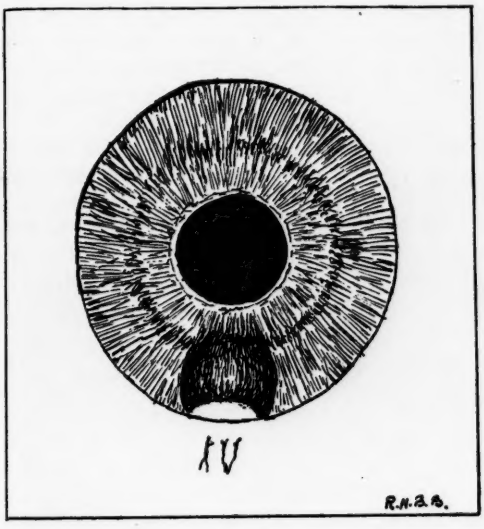

FIG. 1.

FIG. 2.

The cut surface of the neoplasm presents a stippled appearance of white dots on a grey background, and with a loupe some areas of myxomatous degeneration are visible. The consistence is soft elastic. The pars iridica retinae and the ciliary epithelium have been penetrated by the neoplasm, which has pressed upon the lens at the equator and produced a capsular cataract.

(*b*) *Microscopic.*—Fig. 2 is a microphotograph which shows the neoplasm arising from the ciliary epithelium and infiltrating the ciliary body. At the periphery the cells are arranged in rows of short cubes and resemble those of the ciliary epithelium, some are pigmented and others non-pigmented. In the centre of the neoplasm the cells are disposed irregularly. There are areas of hyaline, colloid, and myxomatous degeneration, also cystic spaces lined by pigmented epithelial cells (see Fig. 4) and containing hyaline material and degenerated cells, some of which are very swollen. Lymphocytes are present at the advancing edge of the neoplasm, and some are aggregated into large clumps amongst the tumour cells. Mitosis is evident in some of the cells of the neoplasm.

Fig. 3 is a microphotograph of the filtration angle at six o'clock. It shows the root of the iris infiltrated by the neoplasm which is pressing against the ligamentum pectinatum and occluding the filtration angle. The canal of Schlemm and the wall of a tributary from the deep scleral plexus of veins were also invaded. At one site

FIG. 3.

the endothelium was stripped from Descemet's membrane, and the intervening space filled by cells from the neoplasm.

The blood vessels at the site of the neoplasm were dilated and congested. Hyaline degeneration had taken place in the loose connective tissue beneath the ciliary epithelium and in the vicinity of the neoplasm, and also in the tunica media of the iris vessels.

Some pigment and red blood corpuscles were adherent to the posterior aspect of the cornea.

Fig. 4 is a microphotograph taken at the point where the neoplasm has penetrated the pars iridica retinae and pressed upon

FIG. 4.

the lens capsule. The hyaline layer of the capsule is rucked up and presents a wavy outline. The epithelial layer has undergone metaplasia and formed a capsular cataract. In the stroma of the iris some cystic spaces are seen. These are lined by short cubical epithelial cells placed side by side. The contents are hyaline material, cell débris, and some large swollen cells with vacuolated cytoplasm.

A pathological diagnosis of primary melano-carcinoma of the ciliary body was made.

Literature

A survey of the literature revealed the rarity of this condition. The age incidence varies from 10 (Greeves' case) to 69 (Snell's case). The authors of the cases reported in the literature have

commented on the following histological appearances; the epithelial nature of the neoplasm and the arrangement of the cells in rows, columns, and in some instances the resemblance to a glandular structure with a central lumen. Colloid degeneration is described and observations made about the comparative avascularity of these neoplasms. Pigment was present in some cases, and was absent or had disappeared in others. A history of previous injury and defective vision was given in several instances. In some cases the pupil was described as being irregular. Displacement of the lens, opacities, and fosette formation from contact with the neoplasm are mentioned by Greeves and other authors. The origin of the neoplasm could be traced into the unpigmented layer of the ciliary epithelium. The root of the iris, ciliary body, and filtration angle were invaded by the neoplasm. Comment is made by some observers that after excision of the affected eye, recurrence of the neoplasm does not occur.

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AN ELECTRIC OPHTHALMOSCOPE

BY

N. BISHOP HARMAN

LONDON

THE optical part of this ophthalmoscope was shown to the Ophthalmological Society of the United Kingdom in 1904, a description of the mechanism was given in the *Lancet*, Vol. LXXXI, p. 28, 1905.

Recently, Messrs. Rayner (who had acquired the original patterns) asked me if I would supervise the adaptation of the original reflecting ophthalmoscope to a self-contained electric fitting.

The new model has certain advantages. The attachment of a battery handle to a magazine ophthalmoscope, such as a Couper's or Morton's adaptation thereof, produces an inconveniently long instrument. This new ophthalmoscope, although it has a range of

70 dioptres, from +30 to −39 in steps of 1 dioptre, is no longer than a May's ophthalmoscope with its small range of lenses.

The range of 70 dioptres is produced by 15 actual lenses The mechanism which I adapted to this ophthalmoscope was invented by Harding, an engineer of Leeds, about 1870. It is thoroughly reliable. It has been extensively used in speed indicators, meters, and stop-watches. The first ophthalmoscope, made in 1903, I have used regularly since then, it has never got out of order.

There are two lens discs. These overlap at the sight hole. The larger, or "units" disc has ten holes, one blank and nine glazed from −1 to −9 dioptres. At one point on the rim of this disc there is a finger-like projection. The smaller, or "tens" disc has

seven holes, one blank the others glazed +10, +20, +30, −30, −20, −10 dioptres. On one face of this "tens" disc is a spur wheel of seven teeth. As the driving wheel is turned past 9 dioptres, the "finger" of the "units" disc automatically engages with the spur wheel and moves the "tens" disc one place either way, according to the movement of the driving wheel. The edge of the "tens" disc is milled, and one part is exposed through the edge of the body of the instrument, so that it can be turned directly to bring a strong convex lens to the sight hole.

In providing an electrical attachment, the aim has been to secure the widest, most variable, and most stable range of illumination. The battery supplying the lamp, is a standard "Ever Ready" pattern No. 1829. It will keep the lamp burning continuously for over 13 hours, still giving sufficient illumination for examination of the fundus; continuous discharge is a severe test. The lamp is gas-filled, and has a small coil filament.

A focusing lens controlled by an external collar, regulates the beam from the instrument. When the collar is at the bottom position, a slightly diverging beam giving the effect of a plano-mirror retinoscope is produced. As the collar is moved upwards the beam becomes converging, until a very short focus is reached, after which the beam becomes increasingly divergent. At a distance of one inch the illumination varies from considerably over 100 foot candles with the filament almost focused, to about 30 with the most widely divergent beam. By using the resistance in the circuit the divergent beam can be reduced to 2 foot candles. Great care has been taken to ensure a fine control of the focusing movement.

Four cells are hinged to the lamp tube and can be interposed between the light and the mirror. They contain filters, red, green, and "daylight," and a diaphragm with a small central hole. These screens can be readily brought into use and are very serviceable.

The instrument is excellent for retinoscopy at the distance of one metre, either with the white or red light. It has proved itself to be a first rate emergency operation lamp, since it will throw a beam of parallel rays of about 20 foot candles from a distance of 6 inches which will illuminate the eye and lids; and as the ophthalmoscope is held horizontally above the eye it is easy to keep it in position and out of the operator's way.

Finally, mention may be made of the covering of the handle which contains the battery. This is coated with an even layer of fine sand which gives a perfectly easy grip. The instrument can therefore be held easily with the fingers with no sense of risk of slipping, and without the damp chilly feeling which comes to leather covered handles after much usage.

The instrument is packed in a case with an arrangement which allows of its immediate extraction when it is required.

A NEW DEVICE FOR TRAINING AND TESTING BINOCULAR VISION

BY

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M.R.C.P.(Lond)., D.O.M.S.

ALL ophthalmologists who have used stereoscopic pictures in the treatment of concomitant strabismus will know the many difficulties in the practice of this method. Chief among these may be mentioned :—

1. The difficulty with young children of knowing what is happening, that is to say, we can tell frequently if the child is seeing with both eyes at once, but it is often difficult or impossible to know if fusion is actually or nearly taking place. A mother will often say, "Yes, I think he sees them alright, but it is difficult to tell."

2. The difficulty of keeping up (or even inducing) the child's interest in the exercises, especially with young children.

3. Because of 1 and 2, the difficulty of getting the parent (or nurse) to continue the exercises, both parties tending to get bored.

The principle of training binocular vision, and later fusion, by co-ordination of eye and hand is made use of in a drawing stereoscope. In my method wax tablets are used. A style is used to draw with, over a piece of transparent celluloid. Beneath this is the picture on tissue paper, and when the tissue paper is pressed by the style against the wax, marks are visible. These can be made invisible in the fraction of a second by sliding the tablet out of its holder. Thus, innumerable drawings can be made on one tablet. This device incorporated in the drawing stereoscope gets over the above difficulties in those cases of squint in which the method is particularly applicable. Thus :—

1. No questions are asked—it will be apparent from what the child draws as to how far there is binocular vision and fusion.

2. Small children like drawing, especially tracing and drawing over pictures, and in doing this they will make an effort and will concentrate on what they are doing. They see the results of their efforts, which often lead to much amusement.

3. Parent or nurse sees what is happening, and by simple ingenuity the pictures can be varied easily, *e.g.*, a pipe put in the mouth of the clown, smoke made to come out of the chimney, candles on the Christmas tree, etc.

This ability to vary and to make one's own pictures is one of the principal attractions of the device, and serves to keep up the interest

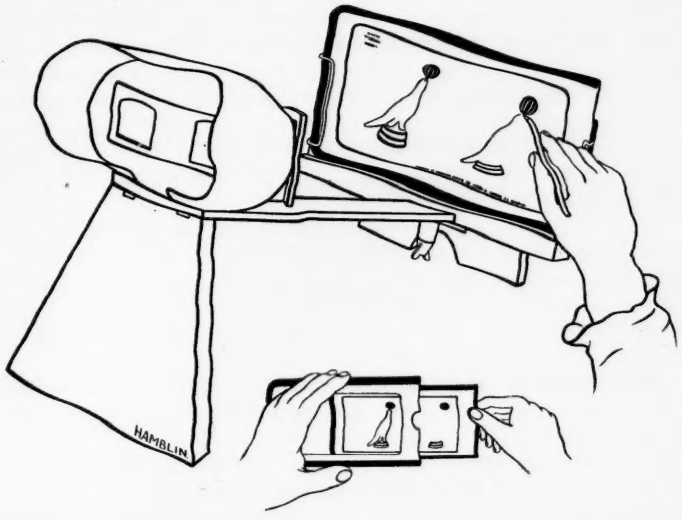
of both parent and child. Also, children are greatly interested in the "mystery disappearance" of the pictures, and like to continue the game for this reason. It is also possible for Noughts and Crosses to be played, the lines of the Noughts and Crosses "board" being the "lock." The child puts his cross on one side, and the nurse puts her nought on the other, and the game is properly seen only while binocular vision is kept up.

The method can also be used as a test for the presence of binocular vision and of fusion. This is often useful in the case of small children who have had a squint and appear to be improving well with glasses. We can judge of the presence of binocular vision easily by observing how they draw, and accordingly vary our prognosis as to the rapidity and permanency of the cure of the squint.

The tablets are made in two series, Junior and Senior (ten in each). Messrs. Theodore Hamblin sell them, and they can be used in any holder that takes their stereoscopic pictures, but it is better to use the drawing board stereoscope which Messrs. Hamblin have made for me, as this gives a firmer support on which to draw. The Junior series is for quite young children, and consists of pictures such as young children draw and without any complicated detail. It is possible for parent or nurse to make additions or variations to them all, to keep up the interest. The Senior set contains more detail, making it harder to draw the pictures correctly, and needing more sustained effort for each picture. Some have a definite "lock," and others no "lock," *i.e.*, no part common to both sides. In those with no "lock" fusion depends on the effort of the patient to see the picture as he knows it should be seen, *e.g.*, the sentry *inside* the sentry box. The patient appreciates his mistakes when he sees how he has drawn the sentry, and the teacher can vary the position of the picture according to the sort of mistake the patient makes. To begin with, for convergent squint, as Dr. Maddox has pointed out, the pictures will probably need to be placed as far away as possible (conversely in the case of divergence the drawing tablet is placed close up). As binocular vision improves, they should be brought up closer, making fusion more difficult in the case of convergence, and farther away for divergent squints. The pictures at present are all arranged so that the two halves are six centimetres apart. A mixed set containing pictures from both series is advised for the use of the ophthalmic surgeon, and he will find certain of these (*e.g.*, feather on clown's nose), particularly useful for a quick test at all ages, and for showing the child and nurse how to play the game.

The method is not meant for cases where there is severe amblyopia in one eye, nor for cases where there is constant and marked squint. It is most useful where there is fair vision in both eyes, and where the eyes become straight at times or almost so with

glasses, or where the eye wanders in when the glasses are removed. It is more particularly applicable to those cases where the left eye is the one tending to squint (which form the majority) so that the patient draws on the right side, and has to superimpose on the right the image seen with the left eye. However, many small children can trace over quite simple outlines with either hand.



This method is useful in the training of older children after operation, and such children can make their own variations and pictures.

The method of carrying out the exercise is as follows:—Suppose we have a child whose left eye tends to squint without glasses. The tablet is taken out of the stereoscope, and the teacher draws over the whole picture on the left side, say the ball on top of the seal's nose, and then continues down drawing over the seal. The child watches, and is told to do just the same in the stereoscope. The ball, which is on each side, acts as a "lock," and if fusion is good, the child draws the seal on the right side directly under the ball (see illustration). The distance of the drawing tablet is varied by noticing where the patient draws—if on the left, there is over convergence, if on the right, divergence. The position is varied accordingly. Various attempts can be made, until the child has got it right or nearly so, and this distance will be the one at which to commence when drawing the pictures, and can be marked

with a pencil on the bar on which the picture holder slides. The nurse can then draw additions, *e.g.*, pipe in the seal's mouth, bun, etc., to keep up interest in the game.

It is not wished to claim too much for this method, but it is suggested that it will be found an amusing, and therefore most useful device, in many cases where binocular vision and fusion need training, and that it is also a convenient and rapid method of testing binocular vision and fusion in patients of all ages. It is also useful as an exercise for children who have trouble with their lessons owing to weak convergence at reading distance.

Messrs. Theodore Hamblin, of 15, Wigmore Street, W.1, supply the tablets with the pictures, and also the drawing board stereoscope. They are not expensive.

ANNOTATION

Certification of Blindness and Ascertainment of the Causes of Blindness

The report of the Prevention of Blindness Committee of the Union of Counties Associations for the Blind has just been issued, and is a most valuable piece of work. The Union of Counties Associations for the Blind set up a Standing Committee, with power to co-opt, on November 20, 1930, to study the problems of prevention of blindness. The Committee now consists of the following: Chairman, Mr. P. M. Evans, whose work on behalf of the blind is so well known as to need no further particularization from us; elected members, Canon Bolam, Mr. Bernard Cridland, Dr. A. Eicholz, Dr. J. Ferguson and Mr. G. F. Mowatt; co-opted members, Mr. J. D. M. Cardell, Mr. T. H. Cresswell, Mr. W. McG. Eagar, Mr. Herbert Fisher, Mr. Lawford and Dr. J. Tate. Dr. J. C. Bridge, of the Factory Department of the Home Office, Mr. F. R. Lovett, of the Ministry of Health, and Dr. J. E. A. Underwood, of the Board of Education, have sat on the Committee, but, in view of their official positions, have not signed the report. The first fact to strike the members of the Committee was the lack of scientific data as to the prevalence of the defects of the eyes determining blindness and the various causes of these defects. They hold that "systematic recording of defects and causes over a term of years and of a large number of cases would provide exact data on a scale never before

achieved, and should lead to far-reaching results in the problems of prevention."

The Voluntary Associations alone were concerned in the matter of assistance for the blind previous to the passing of the Blind Persons Act in 1920, though Government grants had been started by the Ministry of Health under Regulations of August 7, 1919.

At this time there was no system of certification in general use. The Voluntary Associations entered on the official register those whom they had regarded as blind in the past, and new names were added, often without medical evidence. Even where medical evidence was obtained there was at first considerable variety among practitioners as to the interpretation of the definition.

Matters have vastly improved in later years and the most recent figures of the Ministry of Health show that 52 per cent. of the Local Authorities now require certification by an ophthalmologist, with a percentage as high as 66 in County Boroughs, though in the Counties it amounts to only 34 per cent.

With regard to old age pensions the results have been found to be divergent. Cases appear in which it has been decided that a person is not blind for the purposes of Old Age Pension, while at the same time the Registration Authority has decided that the same person is blind and *vice versa*. It is true that in such cases a right of appeal is lodged with the Minister of Health, who can review the evidence and, if he thinks fit, order the claimant to be examined by a Regional Medical Officer. If still in doubt the matter may be referred to an ophthalmologist, in which case alone the State pays the ophthalmologist's fee.

The Committee strongly advise unification of the procedure of certifying blindness on the register and for the granting of a Blind Old Age Pension. Matters have been placed on a more satisfactory footing in Scotland, where a clinic for the certification of blindness was set up in Glasgow in 1929; but before this the mission to the out-door blind for Glasgow undertook pioneer work in this direction under the inspiration and guidance of Dr. Freeland Fergus, whose report in 1926 was the subject of an annotation in these pages, Vol. X, p. 343.

Space does not permit of much further abstraction of this valuable report, but we may note some of the recommendations. Briefly these are that the Minister of Health should require:

(1) That no one should be registered as blind without a certificate by an ophthalmic surgeon. (2) The existing register should be revised. (3) Local Authorities shall appoint medical practitioners with special experience in ophthalmology who shall be approved by the Minister of Health or the Board of Education in cases coming respectively under their jurisdiction, and shall make arrangements for the examination of cases. (4) In the event of a candidate

being unable, for valid reasons, to attend at the appointed place, the Local Authority shall arrange for a certifying ophthalmic surgeon to visit such a case and pay expenses. (5) Every certificate should be made out on a form prescribed by the Ministry of Health (copy attached). (6) The information so obtained should be collected and studied with a view to prevention of blindness

There is a short paragraph on the importance of the examination of children of school age who show serious visual deterioration, and a discussion on the definition of blindness. In this the Committee suggest three groups: Group 1, vision below 3/60 Snellen; group 2, vision of 6/60 Snellen or better; group 3, intermediate degrees of visual acuity. The condition of the visual field is strongly emphasized: hemianopia of any kind with tolerably good form vision (6/18 or better) should not be certified; and finally of paramount importance is the age at which blindness occurred

Among the appendices will be found the report of the Council of British Ophthalmologists which has formed the basis on which this report has been built.

A word of praise is due to the Secretary, Miss Cracknall, for her share in the preparation of this report.

We consider that this report should be in the hands of every practising ophthalmic surgeon in the country; it can be obtained at a cost of 1s. from the Secretary, Prevention of Blindness Committee, 66, Victoria Street, S.W.1.

ABSTRACTS

GENERAL MEDICINE

Sjögren, Torsten.—Juvenile amaurotic idiocy. Clinical and hereditary investigations. (Die juvenile amaurotische Idiotie, Klinische und Erblichkeitsmedizinische Untersuchungen). [Statens Institut för Rasbiologi, Upsala und S. T. Lars Sjukhus, Lund]. *Hereditas*, Vol. XIV, pp. 197-425, 1931.

This comprehensive and important work extending to some 228 pages appears in *Hereditas*, a periodical published by the Mendelian Society in Lund. In the introduction **Sjögren** gives an account of the work of previous authors on the subject of juvenile amaurotic idiocy and a description of the disease based largely on a review of the subject by Schob (1924). The author's own material was obtained from certain institutions for the blind in Sweden and it is surprising how many cases of juvenile amaurotic idiocy he found, as

hitherto no case of this disease had been published in Sweden. In the Värd institution for the blind in Lund, he found 29 cases which showed the disease from the earliest to the latest stages. These he personally examined. Syphilis was always excluded. The negative result, together with the general examination, and ophthalmoscopic exåminations by Doz. B. Rosengren with their surprising uniformity, made, he considered, the diagnosis certain. A histological examination in 18 of these cases was made by Prof. Einas Sjövall which in all cases confirmed the clinical diagnosis. From records at the same institution he found nine more cases. From Drottning Sophias Stiftelse in Vänersborg he obtained 34 cases; one of these was personally examined. Tomteboda cases numbered eight and Jäxjö cases five; of these Sjögren examined four. Cases that were not in any of the above institutions numbered 30; in four of these the author made a clinical examination. Five cases were from colleagues. The diagnosis in one case was made in the psychiatric clinic at Stockholm and confirmed anatomically by Prof. E. Sjövall.

The clinical analysis is based principally on the 39 cases of juvenile amaurotic idiocy investigated by the author, who had the opportunity of following personally the majority of these cases for from two to three years. The children develop normally until the fifth to eighth year when the disease begins with marked diminution of vision which in the course of one to two years leads to blindness, only the power to count fingers or perception of light remains. In the early stages the optic disc is yellowish grey with narrow vessels. The thin vessels are very characteristic and are present before vision is lost. In these early cases pathological pigmentation is not as a rule present. The changes are symmetrical. In somewhat more advanced stages there are found at the periphery—and this is by far the most frequent type of degenerative change—small, round, closely placed and partly confluent spots with badly defined edges, with sparsely scattered pigment granules, as well as retinal atrophy of the papilla; in other cases the ophthalmoscopic appearance is exactly that of retinitis pigmentosa, although differing from typical retinitis pigmentosa by its early onset and rapid progress. Still later bone-corpuscle-like pigmentation appears at the periphery of the retina and in the most advanced cases may cover the fundus completely. At this stage posterior cortical cataract sometimes appears. Pupils in the early stage have good reactions, with on-coming amaurosis they become fixed. In seven cases in the earliest stage no ophthalmoscopic changes were seen though there was amaurosis or marked diminution of vision. All these cases (except Berta J., who was only once examined) at later stages showed ophthalmoscopic changes of characteristic type. Sjögren then refers to particulars of seven cases that seemed suitable to throw light on whether the

conception of "familial maculo-cerebral degeneration" advanced by certain authors (Batten, 1903; Oatman, 1911; Stargardt, 1913, 1917) is justified. All of these seven cases have shown in the earliest stage degenerative macular changes and five of them on subsequent ophthalmoscopic examinations have shown the characteristic ophthalmoscopic picture of juvenile amaurotic idiocy. As regards the onset of blindness the author's material shows that when the disease comes on in two or more siblings, as a rule it is at the same age and likewise of the same type.

Psychic symptoms appear about the same time as the onset of blindness though occasionally later. There is a slow progressive failure of all psychic functions. Epileptic attacks may set in early, but usually they occur at later stages. Disturbance of speech is noticed about the same time as psychic deterioration begins. It is very constantly found two years after the onset of blindness. It is characterized by a peculiar stuttering, often explosive articulation, with reiteration of words or syllables—at this stage dementia of imbecile type occurs. The disease has now so progressed that the children can no longer be instructed in the blind school.

An interesting account is given of the neurological symptoms. This is accompanied by photographs to show characteristic attitudes and disturbances of gait at different stages in subjects of juvenile amaurotic idiocy. There is disturbance of gait in form of *marche à petits pas*, often combined with a *Démarche trépidante*. As a rule, signs of a pyramidal path lesion have not been found. Phenomena like astasia abasia, as well as balance disturbance as in cerebellar ataxy, occur in later stages. A crouching attitude with head and upper part of body bent is manifest. When these patients try to walk it is often observed that they tramp on the same spot before progress is made. In the last stages they sit where they have been placed, without interest in anything, with dull fixed mask-like expression—speech has gone—death occurs often from intercurrent disease. The age at death is shown in Table V. In Groups I and II it is about 17 years and in Group III 18 years.

Differential diagnosis. Pathognomonic parenchymatous changes make the diagnosis clear in cases where the brain has been examined anatomically. In clinical differential diagnosis, chiefly of interest are juvenile general paralysis, some forms of congenital cerebral syphilis and cerebro-spinal affections with optic atrophy or choroido-retinitis, as well as certain rare forms of familial juvenile diffuse brain sclerosis.

In the part of this work devoted to heredity the material has been worked out and analysed in the same thorough manner as in the clinical part. For hereditary statistical analysis the author's own material consists of 59 families, belonging to 50 stocks with 115 cases of juvenile amaurotic idiocy. Early in the investigation it was

observed regarding geographical position that these stocks showed a distinct tendency to be collected at centres. Further the tendency to migrate was strikingly insignificant. Consanguineous marriages in the parents of cases of juvenile amaurotic idiocy have been worked out as well as their frequency compared with those occurring in the general population. In a summary of the nearer degrees of consanguineous marriages, namely marriage between (1) 1st cousins, (2) 1st cousins once removed, (3) 2nd cousins, the following results are given. For Group I, 25, 7±7, 4 per cent. Group II, 27, 5±6, 3 per cent. Group III, 25, 4±5, 7 per cent. The corresponding numbers for the general population are 2·3 per cent. (Lenz), 1·29±0, 0·09 per cent. (Wulz), 9·6±1·4 per cent. (Spindler). This marked increase in the percentage of consanguineous marriage is the most important criterion for a recessive inheritance. As Lenz (1919) has shown, the inbreeding frequency of parents of recessive-homozygotes must be all the more frequent the rarer the disease is in the population. From the analysis in Table XVIII, the 59 families are seen to be at 23 centres that are distributed in south and middle Sweden. The centres consist of country parishes that are often relatively isolated. With few exceptions, as regards the ancestors of the parents, we have to do with a purely country population that consists mostly of farmers and farm workers.

Sex proportion: Of the 115 cases with juvenile amaurotic idiocy 61 are males and 54 females. The sex proportion in Sweden at the age of seven years (1911-1920) is 104 boys and 100 girls.

There were five twin births. Of these 10 twins, two have juvenile amaurotic idiocy. The twin sibling of both died at a very early age. Four are normal and two have not yet reached the age at which juvenile amaurotic idiocy becomes manifest.

A summary of the hereditary analysis shows that juvenile amaurotic idiocy follows with a high degree of probability the course of a recessive monohybrid inheritance. The disease from the hereditary aspect is quite distinct from the infantile form. The analysis of the ascendants and the probable heterozygote lineage has shown a distinct tendency to accumulation in certain defined areas in different parts of the country. Approximate calculation of heterozygote frequency in the country has given for this disease a value of about 1 per cent.

From the year 1917 a continuous marked diminution of the frequency of juvenile amaurotic idiocy in Sweden has been shown. The natural explanation of this may be a diminished frequency of consanguineous marriages from an increased migratory tendency as well as from possibly diminished birth rate.

Statistical investigations have been carried out in certain categories of relatives of juvenile amaurotic idiots, namely siblings, step-brothers and sisters, parents and parents' siblings. For the last

category, which represents the largest material, the following numbers have been obtained of probability of disease (Group III). For juvenile amaurotic idiocy: 0·49±0·34 per cent. For epilepsy 1·05±0·52 per cent. For dementia praecox 1·46±0·65 per cent. For "oligophrenie" 1·50±0·61 per cent. The numbers have, in comparison with those of the German research institute for psychiatry in Munich for the general population, been found high, but on the other hand opposed to this no statistical significant difference could be found in regard to a single disease.

Sjögren's work is well illustrated by numerous figures, pedigree charts, tables, and some photographs, and there is appended a bibliography. The author of this valuable and very interesting article, which will appeal equally to neurologists and ophthalmologists, thus briefly gives his principal results.

1. It has been shown that juvenile amaurotic idiocy in Sweden appears relatively frequently in proportion to its extraordinary rarity in foreign literature.

2. It was established that the ophthalmoscopic changes as well as the development of the neurological symptoms showed marked similarity and constancy in their progressive course. Special attention has been drawn to the importance of symptoms of extrapyramidal motor character, motor disturbance, disturbance of gait in the form of a *marche à petits pas*, often with *Démarche trépidante* with in addition crouching attitude, hypertonus of preponderating rigid type. The typical course of development and symptoms of the disease have been described in form of a classification. The disease shows in its typical manifestations so characteristic a picture that as a rule a certain clinical diagnosis may be made, even though it appears singly in a family.

3. Juvenile amaurotic idiocy follows with a high degree of probability the course of a recessive and monohybrid inheritance.

4. The disease in hereditary respects is quite different from the infantile form.

5. The ancestors who are probably heterozygotes show a distinct tendency to accumulation in several defined areas in different parts of the country.

6. The statistical investigations in regard to the inheritance of dementia praecox, "oligophrenie," and epilepsy amongst the siblings of the parents, have given a remarkably high figure for disease probability, without, however, significant differences being obtained regarding the individual diseases found in the general population.

A. F. MACCALLAN.

BOOK NOTICES

THE WILLS HOSPITAL OF PHILADELPHIA

The influence of European and British Ophthalmology upon it, and the part it played in the last 100 years in developing Ophthalmology in America.

By WILLIAM CAMPBELL POSEY, B.A., M.D., Consulting Surgeon to the Hospital, and SAMUEL HORTON BROWN, M.D., Fellow of the College of Physicians. Containing 340 pages and numerous portraits and other illustrations. J. B. Lippincott Company. Price, $ 5.00.

Should a student in a future generation wish to learn the way in which his forefathers conducted themselves, he will find numerous books describing how they fought, struggled with, and tortured one another; it will be a satisfactory counter blast to these for him to come across the one here reviewed, describing the upgrowth and work of an institution for the relief of pain and suffering, now in the hundredth year of its existence.

The name of Wills is esteemed for philanthropic benevolence to charitable medical institutions on both sides of the Atlantic. In England, in the City of Bristol in connection with its General Hospital, and in the United States of America, in the City of Philadelphia in connection with its Eye Hospital.

James Wills, Senior, who was born in 1760, settled in Philadelphia about the beginning of the 19th century, and started there a very prosperous business as a grocer, to which on his death his son, also named James, succeeded. Both of them were members of the Society of Friends and of frugal habits. James Wills, Junior, never married, and on his decease left the bulk of his fortune, which ultimately amounted to $122,548.57, for the erection and accommodation of a hospital to be denominated, "The Wills Hospital for Relief of the Indigent Blind and Lame," the Mayor and Corporation of the City being intrusted with the appointment of trustees or managers for the administration of the bequest.

It is suggested that the testator, who was a very pious individual, was influenced in the peculiar wording of the bequest by a picture which had been painted by Benjamin West for the Pennsylvania Hospital illustrating the scriptural text:—"And great multitudes came unto Him, having with them those that were lame, blind dumb, maimed, and many others, and cast them down at Jesus's feet; and He healed them." It also seems likely that Wills was influenced in the matter by his physician, Dr. Joseph Parrish, also a Quaker, who became the first President of the board of management of the hospital, and whose son, Isaac Parrish, was appointed its first surgeon.

The site chosen for the institution was opposite what was then a small park, one of the four squares chosen by William Penn as lungs for his city and named after his secretary, Logan Square. After much discussion it was wisely determined that it should be a hospital for the treatment of the blind and lame and not merely an asylum. For a time provision was made for the treatment of orthopaedic cases as well as those suffering rom eye disease, and some operations were peformed for club foot. The eye cases, however, were always the more numerous and in the early seventies the hospital seems to have become an entirely ophthalmic institution. In its early years all cases applying for treatment became in-patients; in 1839 an out-patient department was opened, the attendance at which rapidly increased so as to make it one of the institution's predominating features.

The upgrowth of ophthalmology in Philadelphia, as recounted in this book, is an apt confirmation of von Baer's biological law, "that development proceeds from the generalized to the more specialized."

The Medical Department of the University of Pennsylvania was the first of its kind in the United States, being established in 1765. At first surgery, anatomy and obstetrics were all united in one chair. In 1805, surgery was divided off as a separate chair to which Dr. Philip Syng Physick was appointed. He had studied in London under John Hunter, through whose influence he obtained a house appointment at St. George's Hospital. In a journal which he commenced to keep in 1795, of his most interesting cases, the first recorded is one in which he restored a lady's sight by extraction of cataract, a form of operation for cataract for which in those early days, when couching was largely practised, he had decided preference.

The four surgeons who first formed the staff of the Wills Hospital in 1834, were Isaac Parrish, Squier Littell, Isaac Hays, and George Fox. Of each of these, as also of all the other deceased members of its staff, the authors give well reproduced portraits together with short but very complete biographical descriptions. Isaac Hays, who was of Hebrew descent, is well known in this country through his great literary ability. He edited the American edition of Sir William Lawrence's "Treatise on Diseases of the Eye," which passed through three editions, and was highly approved of by Lawrence, as is shown by the following letter which he wrote to Hays:—"I feel it is a particularly fortunate circumstance that one so thoroughly conversant with the whole subject, and so used to literary composition, should have undertaken the troublesome task of making these additions to my treatise published in 1840, and which are necessary to bring it up to the present state of knowledge, and that you have conferred on it the new and interesting feature of so many beautifully executed pictorial illustrations."

In 1847, Hays also edited "The Principles and Practice of Ophthalmic Medicine and Surgery," by T. Wharton Jones. From 1826 to 1869 Isaac Hays was the sole editor of the *American Journal of Medical Sciences*, and the joint editor with his son up to the time of his death in 1879. In this Journal appeared not only many original papers on ophthalmology, but also a useful review of the most important papers which had appeared on the subject in other journals.

Succeeding the first staff came a group of general surgeons, nearly all of whom were on the staff of the Pennsylvania Hospital and served the Wills Hospital for the opportunity it afforded them to perfect themselves in eye surgery. Amongst them was D. Hayes Agnew, of whom the authors speak as perhaps Philadelphia's greatest general surgeon.

The Civil War exerted a great influence upon the Wills Hospital, every member of its staff becoming engaged in active military service. Late in 1861, when plans were being consummated for the spring campaign of the army of the Potomac, preparations were made for a number of large hospitals in cities near the field of action. Next to Washington, Philadelphia became the largest hospital centre.

By 1860 the practice of general surgeons devoting some of their time to ophthalmology as a speciality began rapidly to pass away. The dominant influence upon ophthalmology in Philadelphia up to then was British, all those who occupied the chair of surgery in the University of Pennsylvania had been trained in London and Edinburgh. With the advent of von Graefe, von Helmholtz and Donders and their discoveries to the world, members of the Wills Hospital staff went to sit at their feet, and after their death to attend at the clinics which they had established. London, however, was not neglected, for the staff at Moorfields continued to attract Americans who went abroad to study the eye.

In accordance with von Baer's law, ophthalmology as it developed was rapidly becoming more specialized, and those who went abroad to study after 1860, returned as ophthalmologists, though many treated diseases of the ear also and continued to do so until the development of otology and oto-laryngology relieved them of this necessity. Though ophthalmology was of necessity becoming a specialized branch of medicine and surgery those who practised it, for a long time greatly resented being described as "specialist," more especially Littell and Fox, their fear being that if so designated they would be regarded as quacks by the profession.

Amongst those surgeons on the Wills Hospital staff who returned from abroad impressed by the wizardry of von Graefe or the enthusiasm and learning of Donders, were Dyer, Keyser, McClure, Norris and Strawbridge.

Dr. Andrew Douglas Hall, an evidently well qualified and keen observer, after being an attendant surgeon at the Wills Hospital for ten years, spent the winter of 1872-1873 abroad, visiting eye clinics in London, Paris and Vienna. He wrote three letters to the *Medical Press* describing what he saw, from which the authors make the following interesting extracts:—At Moorfields, Hall was impressed by Streatfeild's dexterity. Jonathan Hutchinson showed him examples of the notched teeth of congenital syphilis, and referred to a peculiar appearance of the temples in these cases, "consisting of a furrow or excavation between the zygomatic arch and the superciliary ridge of the orbit." He saw Bowman trephine the cornea for Saemisch ulcer, the object being to relieve tension. Hall was entertained by him at his home and describes him as "a slender scholarly-looking man, with a quiet, gentle face and of medium height." Critchett in personal appearance was, he says, just the opposite of Bowman, "a large well-made man, bald with a fringe of dark hair, dark side whiskers, having a quick, dark eye, a bright mobile face, with very frequent humorous expression, jolly." Couper gave a course of ophthalmoscopic demonstrations, at four o'clock in the afternoon followed by a lecture an hour later.

Hall also visited Bader's clinic, evidently at Guy's Hospital, and describes him as "a very adroit operator; in two hours he must have done twelve or fifteen operations. He is a slight gentleman of English appearance but having a slightly foreign accent. He is German but left that country during the revolution in 1848."

Of Liebreich at St. Thomas's Hospital he says: "He had been family oculist to the French Imperial Family and had left Paris during the War, and being called to the chair of ophthalmology at St. Thomas's Hospital settled permanently in London. On the walls of his clinic room were the chromo-lithographs so familiar

to us from his Atlas, framed and glazed for reference by the students. His hand is so tremulous that it is almost painful to see him operate; and yet he operates well; for certainly his results as I saw them were admirable."

Hall thought the teaching in Vienna was carried to a perfection superior to that in London. He says: "As in England, as with us, teaching is too apt to be a step to something else, to be relinquished when that something more desirable is attained. In Germany it is looked upon as a man's business; he begins as a teacher and he expects to end as a teacher and as a consequence the instruction is most painstaking and most thorough."

The names of Dr. William Fisher Norris, one of Philadelphia's most distinguished ophthalmologists, associated with that of Dr. Charles Oliver, at one time his assistant surgeon at the Wills Hospital, will be familiar to all those interested in eye diseases as editors of the monumental work in four volumes, "A System of Diseases of the Eye."

Dr. Norris studied at the Vienna school for a period of five years, when it was at the height of its glory, under Arlt, Jaeger, and Mauthner, and in the laboratory under Stricker. He purchased the original drawings made by E. Jaeger to illustrate his atlas; these are now in the possession of the College of Physicians of Philadelphia. On his return to Philadelphia in 1872 he became surgeon to the Wills Hospital and afterwards Professor of Ophthalmology at the University. He taught, had associated with him, and inspired a large number of the rising generation of ophthalmologists. Dr. de Schweinitz, who succeeded him in the chair of ophthalmology, wrote of him in the following glowing terms:—"As teacher, author, editor, surgeon, he pursued his fine career with great distinction and dignity. His influence for good on the young men he taught and with whom he came in contact constitutes a valued asset in the development of ophthalmology in this city. He was an exemplar and a model of the ethical life of our profession."

As the interest in ophthalmology continued to increase men felt the need of meeting together and of interchanging ideas and experiences in this field. In 1864 the American Ophthalmological Society was created, many of the early members of which had been well acquainted with each other while studying abroad and eagerly seized the opportunity it afforded to cement old friendships. The Society was national from its very beginning and continues to hold annual meetings at which ophthalmic subjects alone are discussed. Its aim from its inception has been to encourage and maintain the very highest ideals in the matter of ethics among its members, the number of which is limited. It is the oldest ophthalmic society in the English-speaking world, its

only predecessor having been a gathering of ophthalmologists who met yearly in Heidelberg since 1857 under the leadership of von Graefe, and which led to the formation of the Heidelberg Congress in 1863.

The generation of surgeons who succeeded those already referred to had many of them been officially connected with the Wills Hospital previous to their appointment as Attending or Full Surgeons. Thus Doctor Zentmayer served under Doctor Norris, eleven years; Doctor Posey under Doctor Oliver, nine years; and Doctor Schwenk under Doctor Harlan, eight years.

This term of subordinate service proved of value both to the Hospital and to the assistants themselves; to the former by long services, while the latter, under the guidance of the attending surgeons, had opportunity to observe their methods, and perfect themselves in treatment before assuming responsibility.

At the present time the surgical staff consists of seven attending surgeons, each of whom has two assistant surgeons, and some also clinical assistants. There are also the following associated clinics; departments of physiological optics, dentistry, dermatology and syphilology, oto-laryngology, and internal medicine.

In the year 1870 the management of the Hospital became vested in a newly created Board of Directors of City Trusts. As years passed it became evident to this Board that the old hospital building was no longer adequate, and that a new building was required. The site of the hospital in Logan Square had also in the course of time greatly increased in value. In June, 1930, it was advantageously sold, and from the proceeds in March this year sufficient ground was acquired at the North-West corner of Sixteenth and Spring Garden Streets for the erection of a new hospital, with a bed capacity of 200 patients capable of increase to 250 without crowding. This building the promoters hope, if sufficient funds are forthcoming, will not only be an institution for the treatment of diseases of the eye, but also one to determine the nature of such morbid processes and lead to their prevention.

It is hoped that the quotations and paraphrases here made from this interesting book will serve to whet the appetite of readers for the extensive and substantial fare which awaits them in the perusal of the book itself. For not only is it an account of the growth of a hospital but also incidentally of the development of ophthalmology in the United States of America.

E.T.C.

Lehrbuch und Atlas der Spaltlampenmikroskopie des lebenden Auges. By ALFRED VOGT. Second Edition, Part II. Berlin: Julius Springer, 1931. Price, R.M. 298.

The second volume of Vogt's Atlas is a book of imposing size. It measures 11 inches by 8 inches by 2 inches, and weighs 6 pounds. It would have been better had it been bound in two volumes, for it is so unwieldy that it must be read with a book-rest. An alternative method is to sit in an easy chair with two cushions on the knee to support it. The price seems a large one, but there are 815 illustrations mostly coloured, and, when is is realized that a book of this kind cannot become obsolete any more than Gray's Anatomy, then the purchase must be considered to be a good investment. It would be quite impossible for such a book to be written in this country. Under the voluntary system, no one with the necessary knowledge and ability could afford the time to carry out the investigations, nor would he in any of our Ophthalmic

Hospitals be able to have access to the necessary material. At a Continental Clinic one man is in charge, and he has command of the whole clientelle. Most of the larger hospitals have a professional artist on the staff, and so it is possible to have a pictorial record of all interesting and important conditions. But even with all these advantages none but the hand of a super-master, gifted with prodigious industry and unrivalled powers of observation could have produced the monumental work under review. The illustrations are of the highest order, are real works of art and are beautifully reproduced.

The second volume is entirely devoted to the lens and zonula. In a general introduction we are shown that the lens is a purely optical organ of epithelial origin. Devoid of blood vessels, lymphatics and nerves, it is not affected by those changes which are seen in the cornea. Inflammation and cell infiltration cannot occur, but on the other hand degenerative processes are common and the influence of heredity is very marked. The changes that take place during the development of the lens, the alteration from the globular embryonic lens to the plano-convex structure found in the adult structure, are compared with the types of lenses seen in the lower animals. The spherical lens of fishes gradually becomes flatter as we climb the scale. The simple linear suture of the rabbit, and the three-armed suture of the pig develop into the more complex suture systems of the primates. In no other structure can we so well demonstrate the truth of the statement that phylogeny is mirrored in ontogeny. The increased complexity of the sutures has a causal relationship with the flattening of the lens. The fact that the various zones of the lens have an increased curvature from without inwards is due to the fact that the central suture systems are simpler than those of the more peripheral lamellae.

The next section describes the architecture of the normal lens. The slit-lamp has given us a knowledge of the intimate structure of the lens that could never have been gained by the older methods of research: maceration, sections, and examination with the microscope. Vogt's views upon the structure of the lens are now so well known that it is not necessary to dwell upon this part of the book. We shall mention only a few salient points. The exact course of the fibres of the lens is perhaps not fully understood by all. Plate 84, and especially Fig. 693*f* make their course clear. In the rabbit there are two linear sutures, vertical in front, horizontal behind. The fibres run from the ends of one suture to the centre of the other, and so all are approximately of the same length. Then we see the more complicated Y-suture of the pig, and that of the embryonic nucleus of the human lens.

Vogt has made a model of plaster of Paris, and a photograph of this demonstrates the run of the fibres, from the tip of one suture to the centre of the other. Here again we get lens fibres of equal length. A table is given of the measurements of the depths of the various zones of discontinuity. These have been made with the aid of the micrometer eyepiece. The central zones are more compressed, sclerosed, than the outer; but it does not follow that the sclerosed portions have a higher refractive index; in fact, Freytag's researches seem to show that the reverse is the case. He found that in a child's lens there was a greater difference between the indices of refraction of the cortex and the nucleus than there was in the adult lens.

Gullstrand thought that the change of shape in the lens in accommodation was explained by supposing that the individual fibres slipped over one another. Vogt gives reasons for not accepting this view, and he suggests that the change of shape is associated with a flow of fluid within the fibrils.

Investigations have been made at Zürich upon the fluorescence of the lens in various types of light. Spectra are given on Plate 99.

Several beautiful drawings show the different forms taken by vestiges of the pupillary membrane, and the varied forms and remnants of the hyaloid artery are described and figured. Fig. 719*a* and *b*: the hyaloid arteries of the foetus of a rabbit are especially interesting.

It is impossible in the space at our disposal to mention more than a few of the varied forms of cataract figured in this book; they are legion, and one feels that the author must have exhausted all the possible kinds of opacity in the lens. Fig. 1139 schematizes the situation in the zones favoured by different types of opacity.

The remarks upon nuclear cataract are valuable. Sclerosis of the central part of the lens is a conservative process, because hardened fibres are less prone to changes which would impair the transparency of the structure. When degeneration does occur in the central nucleus it takes the form of dust-like opacities, whereas in the cortex, gross drop-like masses are the rule.

Nuclear cataract begins in the inmost nucleus, then there is often a lucid interval, followed by a band of opacity, between the clear cortex and the capsule. Even in far advanced nuclear cataract there is always a transparent space under the capsule.

The lens with a "double focus" is always associated with nuclear sclerosis with an interval. This condition is quite common, but is generally not diagnosed. The sclerosis of the embryonic nucleus is in this case accompanied by a rise in refractive index, with the result that the axial rays are brought to a focus which is shorter than that of the peripheral rays. Fortunately in most cases there is a senile meiosis and so lental myopia is the obvious result. Vogt finds that most of these patients have a pre-exiting myopia. This has not been the experience of the reviewer. The fate of these lenses is to devolop into *cataracta brunescens* or *nigra*.

Diabetic cataract is not very common, for the majority of the cases so diagnosed are mere senile cataracts in diabetic subjects. The typical form is seen in young diabetics: opacities start close under the two capsules. No lens changes are found in cases of diabetic myopia and hyperopia, except that perhaps the lens architecture tends to be blurred. In cases of tetany and in cachexia strumipriva the lens fibres become more obvious, and sub-capsular opacity develops. A special form of capsular cataract, *cataracta dermatogenes* is described as occurring in juveniles suffering from neuro-dermatitis chronica.

The typical cataract found in myotonic dystrophy is of great interest because it is of help in the diagnosis of early cases. Thompson's disease is a familial disease found in all countries. In addition to the well-known muscular anomaly there are changes in the glands, atrophy of the testes and ovaries, and marasmus. The cataract appears as a posterior rosette with glistening iridescent particles in the anterior and posterior cortex.

Plate 173 illustrates a typical cataract of the capsular type that appears in acute glaucoma. This is important, because the opacities might be ascribed to the effect of an operation.

The capsule is composed of layers, generally about ten. The superficial lamella of the anterior capsule tends to peel off. In senile persons it scrufs up at the periphery and forms a dusty deposit on the periphery of the lens. This may accumulate in the iridic angle and cause *Capsular Glaucoma*. This condition is probably not at all uncommon, and should be kept in mind. At the end of 1929 Vogt had notes of 36 cases. In addition to the peripheral degeneration of the capsule, there is a tendency for a central lenticular detachment to form.

The detachment of the anterior layer of the capsule in glass-blowers, and others exposed to great heat (a chef who had stood over a grill for many years is one example) is of a different type, and accompanies the pathognomonic form of ray-cataract.

The anterior lamella of the capsule is not the same as the zonular lamella, a peripheral structure to which the fibrillae of the zonula are attached.

The book ends with a most instructive account of the anatomy of the zonule. Figs. 1470 to 1473 are photographs of the zonule taken in mirror-light from the posterior aspect. The fibres are grouped into bundles which run, one on each side of the ciliary processes, starting from an origin far back near the ora serrata to be inserted into the anterior and posterior aspects of the lens equator.

Vogt's Atlas is a book that every ophthalmologist who is devoted to the professional side of his work should possess whether he can read German or not, for the illustrations alone are of priceless value.

T. HARRISON BUTLER.

The Fundus of the Human Eye. An Illustrated Atlas for the Physician. By ERNEST CLARKE, C.V.O., M.D., F.R.C.S. Oxford University Press. 1931. Price, 18s. net.

This book is intended to aid the physician in the interpretation of changes observed in the fundus of the human eye as the result of disease. There are 51 coloured reproductions of paintings of the fundus oculi showing some of the more important diseases which

affect it, and in particular, those likely to be of importance to the physician. These have been selected by Mr. A. H. Levy from the collection belonging to Theodore Hamblin, Ltd., of Wigmore Street. Mr. Levy has chosen those paintings which demonstrate the typical features of certain diseases and has written a descriptive legend beneath each. The book is well prepared, the illustrations mounted on art card and beautifully reproduced in colour, the print and binding are also good. It should be a valuable atlas to all medical practitioners, and a help to the ophthalmic surgeon in teaching.

Stereoskopischer Atlas der aüssern Erkrankungen des Auges. By KARL WESSELY (München). A fourth series of ten stereo-photographs in colour (2½ in. by 2 in., on cards, 7 in. by 4 in.). München: J. F. Bergmann. Price, R.M. 12.00.

Notices on the three earlier series appeared in this Journal during the past two years (Vol. XIV, pp. 138 and 427, Vol. XV, p. 602). As in the earlier series, the most satisfactory stereo-photographs have been obtained in affections of the lids and conjunctiva rather than in the more deeply situated lesions.

Eléments de Biomicroscopie Oculaire. LEMOINE ET VALOIS. Paris: Masson. 1931. Price 80 Frs.

Text books of Slit-Lamp Microscopy are becoming more numerous in German, French and English, and as time goes on, and our knowledge increases, so does the necessity of either new text books or new editions arise. Recently there have appeared the second edition of Koby and of the monumental work of Vogt, the third volume of which will appear before long.

This text book of Drs. Lemoine and Valois is a modest work with, nevertheless, 156 illustrations, a few of which are coloured. It is, as it were, an epitome of the volumes issued under the aegis of the French Ophthalmological Society.

The plan of the work is that to which we are accustomed. The first seven chapters deal with the principles of the art and the theoretical basis of the apparatus, and methods of use, followed by six chapters in which the conjunctiva, cornea, anterior chamber, iris, lens and vitreous are dealt with, under the headings of special technique, normal appearances, congenital anomalies, senile changes, traumatic lesions and pathological alterations. When treating of the cornea there is a special section on inflammation and in the chapter on the lens, stress is laid upon changes seen in youth as well as those that may be classified as presenile. There is a short chapter on examination of the angle of the anterior chamber, the retina, and finally a fairly comprehensive bibliography.

We feel sure that this work will be of great value to the beginner as it is so lucidly written and the illustrations so well chosen. It has the advantage of a comparatively low price.

CORRESPONDENCE

DIET DEFICIENCY AND TRACHOMA

To the Editors of THE BRITISH JOURNAL OF OPHTHALMOLOGY.

SIRS.—In his letter to the *Medical Journal of Australia* published in the issue of October 10, to which attention was drawn in the current number of the *British Journal of Ophthalmology,* Dr. Lockhart Gibson refers with kindness to a paper of mine on the Epidemioloy of Trachoma (*Brit. Jl. of Ophthal.,* July, 1931.) He comments on the absence of mention of a deficiency of vitamin A in the diet as a contributory agent in the causation of trachoma.

It is usually accepted that any depressed physical condition presents a more favourable culture medium for the infective principle of contagious disease than perfect health. It may be conceded, therefore, that this may be the case with trachomatous infiltration of the eye and its appendages. But trachoma is constantly being seen in children who have enjoyed the rich and varied diet which is common in the homes of well-to-do fellahin in Egypt, as well as in the homes of Europeans, and who are apparently in admirable physical condition.

In exceptionally severe cases of trachoma, which may be met with in stages Tr. II*a* and Tr. II*b*, it is common to find a severely depressed physical condition due to famine, ankylostomiasis, bilharziasis, or all these conditions combined.

I must, therefore, state that as far as my experience goes neither defective diet, nor a depressed physical condition (including the so-called adenoidism) is an essential factor in the process of trachomatous infection.

Dr. Lockhart Gibson is not quite correct in stating that primary infection with trachoma was unknown in Egypt during the War. Colonel Eason, A.M.S., reported that in two and a half years between 1916 and 1918 out of 30,000 eye cases among the troops he found 63 men to have contracted trachoma in Egypt or Palestine (Bulletin of the Ophthalmological Society of Egypt, 1919).

I agree with Dr. Lockhart Gibson that there is no reason why a patient with certain of the less virulent stages of trachoma, such as Tr. III, should not occupy a bed in the general ward of a hospital provided that (1) ordinary hospital regulations are observed, including a special towel for each patient; (2) the ward is staffed by adequately trained nurses; (3) flies are excluded from the ward or are present sparsely; (4) neither the trachoma patient nor the other patients in the ward have any definite conjunctival discharge.

In the last paragraph of the editorial note in the *British Journal*

of Ophthalmology, January, 1932, it is suggested that an experimental study on the question of diet as an essential factor in infection with trachoma would not present insuperable difficulties. Unfortunately it has not been conclusively proved that any living creature, other than man, can either naturally or by inoculation be made to exhibit those clinical signs by which the disease is recognized.

Yours faithfully,

A. F. MACCALLAN.

January 6, 1932.

NOTES

Death

WE learn, with regret, of the death of Dr. George S. Derby, of Boston, and hope to give further particulars in a later issue.

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Royal London Ophthalmic Hospital. Annual Dinner

THE Annual Dinner of the Royal London Ophthalmic Hospital (Moorfields) will take place on Thursday, February 11, 1932. The Chairman will be Sir William Lister, K.C.M.G.

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Ophthalmological Society of the United Kingdom. Annual Congress

THE discussion on the pre- and post-operative complications of cataract will be opened by Dr. A. J. Ballantyne. Sir Arnold Lawson and Mr. Bernard Cridland will take part in the discussion.

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The Campaign against Trachoma

THE executive committee of the International Organization of the Campaign against Trachoma (founded in 1929 in connection with the Amsterdam International Ophthalmological Congress) elected in Geneva in 1930, assembled on November 13, 1931, in Paris, under the presidency of Dr. Emil v. Grósz. Members present were, besides the general secretary, F. Wibaut: A. Angelucci (Naples), A. F. MacCallan, M.D. (London), M. Marquez (Madrid), V. Morax, M.D. (Paris), Park Lewis, M.D. (Buffalo), — Brandès, M.D. (Antwerp), F. de Lapersonne (Paris), J. van der Hoeve (Leyden), — Zachert (representing Prof. Szymanski, Wilno), and finally, as a representative of the Hygienic Section of the League of Nations, Dr. Pantaleoni.

In his opening speech the president intimated that twenty-four manuscripts had been received for the International Trachoma-Prize-fight instituted by the Royal Hungarian Government. The preparations for this Assembly were made by the general secretary,

Wibaut, who stated that as a result of the economic crisis financial support was not likely to be great.

Support was given in 1930 by the Hungarian Government, in 1931 by the International Council of Ophthalmology, by the Ophthalmological Societies of Holland, Germany, the United Kingdom and Copenhagen, and by the Czecho-Slovak Government. Further support was promised by the American Academy of Ophthalmology and Oto-laryngology, the Japanese Ophthalmological Societies, and the Japanese Anti-trachoma League. For the next meeting of the Organization, which will be held in Madrid in 1933, reports will be prepared

(*a*) ***On the Microbiologic Aetiology:*** by V. Morax (Paris), Birch-Hirschfeld (Konigsberg), Thygesson (Denver,, G. Pittaluga (Madrid).

(*b*) ***On the importance of the Constitution in Trachoma*** : by A. Angelucci (Naples) and A. F. MacCallan (London).

The general secretary, Wibaut, will deliver a report of the answers on the query sheet about the earliest stages of trachoma.

In Amsterdam a library will be founded, containing a number of publications about trachoma.

The next assembly will take place at the same time as the International Ophthalmological Congress at Madrid, in 1933.

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Tenth International Congress of Psychology, Copenhagen, 1932

THE Tenth International Congress of Psychology will take place in Copenhagen, from Monday, August 22, to Saturday, August 27, 1932, under the patronage of H.M. The King of Denmark.

Psychologists and men of kindred sciences can participate as active members of the Congress. In addition, other persons interested can be admitted to some of the meetings as "non-active" members. The fee for active members is French frcs. 150 and for their ladies frcs. 60. The fee for passive members is frcs. 60. The official languages at the Congress will be: English, French, German and Italian. The Congress will be divided into sections, and it is intended to arrange some common symposia with lecturers specially invited. Further information can be obtained from the Secretary, Studiestraede 6, Copenhagen, Denmark.

FUTURE ARRANGEMENTS

1932

February 5.—North of England Ophthalmological Society, at Newcastle-on-Tyne.

February 12.—Section of Ophthalmology, Royal Society of Medicine.

March 4.—North of England Ophthalmological Society, at Liverpool.

March 11.—Section of Ophthalmology, Royal Society of Medicine. (Clinical Meeting).

April 8.—North of England Ophthalmological Society, at Sheffield.

May 12-14.—Annual Congress of the Ophthalmological Society of the United Kingdom, at Edinburgh.

June 10.—Section of Ophthalmology, Royal Society of Medicine. (Annual Meeting).

CONTEMPORARY OPHTHALMIC LITERATURE

American Journal of Ophthalmology. *December, 1931.*

JACKSON. Review of literature of chronic uveitis.
FINNOFF. The relation of tuberculosis to chronic uveitis.
IRONS. The etiology of chronic uveitis.
NUGENT. The pathology and management of intraocular foreign bodies.
FISHER. Intracapsular cataract operation.
MCCOY. Intraocular sarcomata.

Archives of Ophthalmology. *November, 1931.*

MAGITOT. Aqueous humour in glaucoma.
FRIEDMAN. The blue arcs of the retina.
SCHOENBERG. Experiences with the Gonin operation.
FERREE and RAND. A checking standard for tonometers.
REESE. Intrascleral nerve loops.
SAMUELS. Epipapillary tissues.
GOAR. Congenital absence of the lacrimal puncta, and of the canaliculi.
DUNNINGTON. Exophthalmos in infantile scurvy.
BERLINER. Cytologic studies of the retina. 1. Normal co-existence of oligodendroglia and myelinated nerve fibres.

Annales d'Oculistique. *November, 1931.*

HARTMANN and SOURDILLE. Two cases of Lindau's disease: cerebellar angioma in the mother; von Hippel's disease in the son.
MAWAS Cystic capillary angiomatosis of the retina.
PANNETON. Establishment of a mathematically correct table for the calculation of the industrial incapacity due to loss of visual acuity.
ESPILDORA. Cephalitic arterial hypertension.

Archives d'Ophtalmologie. *December, 1931.*

PARK-LEWIS. Cataract in fresh water fish as a result of parasitic invasion of the lens.
DOR. Cure of both eyes in sympathetic ophthalmitis.
COLRAT. Bilateral paralysis of lateral movements of the eyes of congenital origin.
ROCHE. Optical iridectomy ought to be a rare operation.
NEUSCHULER. A new instrument to facilitate dacryo-cystectomy.

Revue Génerale d'Ophtalmologie. *October-November, 1931.*

MIRIMANOFF. Cranio-facial dystrophy and ocular disturbances.

Revue d'Oto-Neuro-Ophtalmologie. *November, 1931.*

FROMENT and COLRAT. Ocular determinations of epidemic encephalitis and disseminated sclerosis. Difficulties of diagnosis.

ROLLET and BUJADOUX. A case of bilateral paralysis of the third nerve in encephalitis. Study of the regression and reflections on functional ocular palsies.

WORMS and CHAMS. Disturbances of accommodation as late sequels of encephalitis.

PAULIAN. On the clinical conditions for the appearance of spasm of conjugate deviation of head and eyes as a late manifestation of encephalitis.

JEAN-SÉDAN. Superior oculo-gyral spasm in a post-encephalitic Parkinsonian, ceasing immediately on lying down.

Klinische Monatsblätter für Augenheilkunde. *November, 1931.*

FISCHER. On localisation in the retina with reference to the apex of the cornea.

PLEGGE. On a new method for measuring the amount of backward displacement of the eye in the orbit by pressure.

WEVE. A case of bilateral *Cysticercus intraocularis*. Spontaneous recovery in the right eye: cure by galvano-cauterization in the left.

HOLST. Results of tangential sclerotomy and subconjunctival iridencleisis in simple glaucoma in the decade 1920-1929.

BIETTI. On the action of urine and metabolised material in reducing the blood pressure in the eye when administered parenterally.

CUSTODIS. On inflammatory infections of the orbit from osteomyelitis of the frontal bone in infants.

BERKAC. Chronic inflammation of the canaliculi from trachoma.

SURAT. On the so-called scleral and corneal reflexes.

ASCHER. On the question of the priority of the separation of the zonular lamella in glassblowers' cataract.

HAMBURGER. The essentials of glaucoma theory.

Bollettino d'Oculistica. *November, 1931.*

ALAJAMO. On the study of Parinaud's syndrome and papilloedema.

PEREYRA. The measure of raised arterial tension: importance of the dangers of raised intracranial tension.

ACCARDI and FONTANA. The reticular tissue of the eye.

VITO. Serological investigations with Bacterium granulosis.

Lettura Oftalmologica. *December, 1931.*

COLAJANNI. On the surgical cure of detachment of the retina.

GALLENGA A method of excluding the accommodative reflex in the determination of the pupil diameter.

MONTANELLI. Light and vision.

BALACCO. Haemopoietic serotherapy in haemorrhagic affections of the eye.

Revista Oto-Neuro-Oftalmologica y de Cirugia Neurologica. *January, 1932.*

MAGITOT. The retinal arterial tension and the cerebral circulation.

RAWSON. Cystic tumour of the pituitary. Hirsch-Segura's operation.

AUSTREGESILO. Clinical decerebrate rigidity. Observations (*continued*).

PAVIA. Grave complication in development of a case of hypertensive retinitis.

Revista Oto-Neuro-Oftalmologica. *September-October, 1931.*

GIOACCHINI. Ocular symptomatology of a fistulised gumma of the frontal sinus.

Archivos de Oftalmologia Hispano-Americanos. *December, 1931.*

LUQUE. Local retinal hypertension of ocular cause.

AMSLER. Observations on Gonin's operation.

January, 1932.

VIDAUR. On tumours of the pouch of Rathké.